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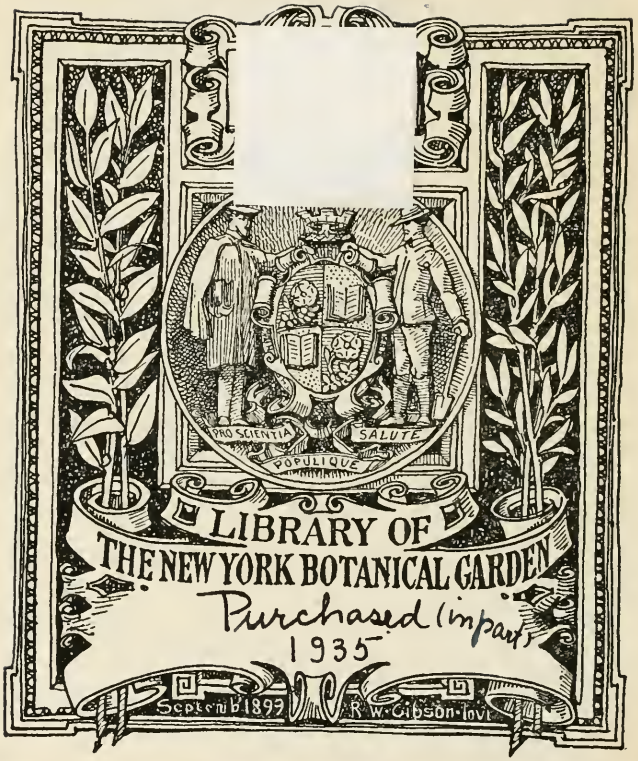
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NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

THIRTEENTH ANNUAL MEETING

ROCHESTER, NEW YORK

SEPTEMBER 7, 8 and 9, 1922

NORTHERN NUT GROWERS ASSOCIATION

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CALIFORNIA

Cajori, F. A., 1220 Byron St., Palo Alto
Cress, B. E., Tehachapi
Thorpe, Will J., 1545 Divisadero St., San Francisco
Tucker, T. C., 311 California St., San Francisco

CANADA

Bell, Alex, Milliken, Ontario
Corcoran, William, Port Dalhousie, Box 26, Ontario
Corsan, G. H., Address 55 Hanson Place, Brooklyn, N. Y.
Corsan, Mrs. G. H., Address 55 Hanson Place, Brooklyn, N. Y.
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CHINA

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Lewis, Henry Leroy, 1822 Main St., Stratford
Morris, Dr. R. T., Cos Cob, Route 28, Box 95
Pomeroy, Eleazer, 120 Bloomfield Ave., Windsor
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Southworth, George E., Milford, Box 172
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White, Gerrard, North Granby

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Beatty, Dr. Wilbur M. L., 4027 Georgia Ave.
Close, Prof. C. P., Pomologist, Dept. of Agriculture
Foster, B. G., 902 G St., N. W.
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Reed, C. A., Dept. of Agriculture

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Clough, W. A., 929 Monadnoch Bldg., Chicago
Falrath, David, 259 N. College St., Decatur
Heide, John F. H., 500 Oakwood Blvd., Chicago
Illinois, University of, Urbana
Marsh, Mrs. W. V., Aledo
Mosnat, H. R., 7237 Yale Ave., Chicago
Potter, Hon. W. O., Marion
Powers, Frank S., 595 Powers Lane, Decatur
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Sundstrand, Mrs. G. D., 916 Garfield Ave., Rockford

Swisher, S. L., Mulkeytown
Wells, Oscar, Farina
White, W. Elmer, 175 Park Place, Decatur

INDIANA

Clayton, C. L., Owensville
Crain, Donald J., 1313 North St., Logansport
Jackson, Francis M., 122 N. Main St., South Bend
Redmon, Felix, Rockport, R. R. 2, Box 32
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*Bowditch, James.H., 903 Tremont Bldg., Boston
Cleaver, C. Leroy, Hingham Centre
Jackson, Arthur H., 63 Fayerweather St., Cambridge
Johnstone, Edward O., North Carver
Mass. Agri. College, Library of, Amherst
Scudder, Dr. Charles L., 209 Beacon St., Boston

MICHIGAN

Beck, J. P., 25 James, Saginaw
Charles, Dr. Elmer, Pontiac
Cross, John L., 104 Division St., Bangor
Graves, Henry B., 2134 Dime Bank Bldg., Detroit
Guild, Stacy R., 562 So. 7th St., Ann Arbor
Hartig, G. F., Bridgeman, R. F. D. No. 1
House, George W., Ford Bldg., Detroit
Kellogg, Dr. J. H., 202 Manchester St., Battle Creek
*Linton, W. S., Saginaw
Mac Nab, Dr. Alex B., Cassopolis
McKale, H. B., Lansing, Route 6
Olson, A. E., Holton
Penney, Senator Harvey A., 425 So. Jefferson Ave., Saginaw
Smith, Edward J., 85 So. Union St., Battle Creek

MISSISSIPPI

Bechtel, Theo., Ocean Spring

MISSOURI

Crosby, Miss Jessie M., 4241 Harrison St., Kansas City
Hazen, Josiah J., Neosho Nurseries Co., Neosho
Rhodes, J. I., 224 Maple St., Neosho
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NEBRASKA

Caha, William, Wahoo
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Brown, Jacob E., Elmer, Salem Co.
Franck, M., Box 89, Franklin
*Jaques, Lee W., 74 Waverly St., Jersey City
Landmann, Miss M. V., Cranbury, R. D. No. 2
Marshall, S. L., Vineland
Marston, Edwin S., Florham Park, Box 72
Phillips, Irving S., 501 Madison St., West New York
Price, John R., 36 Ridgedale Ave., Madison
Ridgway, C. S., Lumberton
Salvage, W. K., Farmingdale
Stover, Evan W., Riverton
Westcoat, Wilmer, 230 Knight Ave., Collingswood

New York

Abbott, Frederick B., 1211 Tabor Court, Brooklyn
Adams, Sidney I., 418 Powers Bldg., Rochester
Ashworth, Fred L., Heuvelton
Babcock, H. J., Lockport
Bennett, Howard S., 851 Joseph Ave., Rochester
Bethea, J. G., 243 Rutgers St., Rochester
Bixby, Willard G., 32 Grand Ave., Baldwin, Nassau Co.
Borchers, H. Chas., Wenga Farm, Armonk
Brown, Ancel J., 418 W. 25th St., N. Y. C.
Brown, Ronald K., 320 B'way, N. Y. C.
Buist, Dr. G. L., 3 Hancock St., Brooklyn
Clark, George H., 131 State St., Rochester
Coriell, A. S., 120 Broadway, N. Y. C.
Crane, Alfred J., Monroe
Culver, M. L., 238 Milburn St., Rochester
Diprose, Alfred H., 468 Clinton Ave., South, Rochester
Dunbar, John, Dep't. of Parks, Rochester
Ellwanger, Mrs. W. D., 510 East Ave., Rochester
Ford, Geo. G., 129 Dartmouth St., Rochester
Gager, Dr. C. Stuart, Bklyn Botanic Garden, Brooklyn
Gilgan, Pat'k. H., 358 Lake Ave., Rochester
Gillett, Dr. Henry W., 140 W. 57th St., N. Y. C.
Goeltz, Mrs. M. H., 2524 Creston Ave., N. Y. C.
Graham, S. H., Ithaca, R. D. No. 5
Haggerty, Susanne, 490 Oxford St., Rochester
Hall, L. W. Jr., 509 Cutler Bldg., Rochester (L. W. Hall Co.)
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Hart, Frank E., Landing Road, Brighton
Haskill, Mrs. L. M., 56 Oxford St., Rochester
Haws, Elwood D., Public Market, Rochester
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Hoag, Henry S., Delhi
Hodge, James, 199 Kingsbridge Rd. W., Kingsbridge, N. Y. C.
Hodgson, Casper W., Yonkers, (World Book Co.)
Hoffman, Arthur S., 36 Church St., White Plains
*Huntington, A. M., 15 W. 81st St., N. Y. C.
Jewett, Edmund G., 16 S. Elliott Place, Brooklyn
Johnston, Harriet M. B., 15th St. & 4th Ave., N. Y. C.
Kains, M. G., Pomona
Lattin, Dr. H. W., Albion
Lauth, John C., 67 Tyler St., Rochester
Liveright, Frank I., 120 W. 70th St., N. Y. C.
Mac Daniel, S. H., Dept. of Pomology, N. Y. State College of Agriculture, Ithaca
Masseth, Rev. John E., Dansville
Mayer, Norman, 30 Avenue "A", Rochester
McGlennon, J. S., 28 Cutler Bldg., Rochester

McGlennon, Norma, 166 N. Goodman St., Rochester
Meyers, Charles, 316 Adelphi St., Brooklyn
Motondo, Grant F., 198 Monroe Ave., Rochester
Nolan, Mrs. C. R., 47 Dickinson St., Rochester
Nolan, M. J., 47 Dickinson St., Rochester
Olcott, Ralph T., Ellwanger & Barry Bldg., Rochester
Piehler, Alois, 706 Commerce Bldg., Rochester
Pirrung, Miss L. M., 779 East Ave., Rochester
Pomeroy, A. C., Lockport
Rawnsley, Mrs. Annie, 242 Linden St., Rochester
Rawnsley, James B., 242 Linden St., Rochester
Richardson, J. M., 2 Columbus Circle, N. Y. C.
Ritvhir, John W., 2 A. Beach St., Yonkers
Ryder, Clayton, Carmel
Schroeder, E. A., 223 East Ave., Rochester
Shutt, Erwin E., 509 Plymouth Ave., Rochester
Smith, Louis R., 145 Merrimac St., Rochester
Snyder, Leroy E., 241 Barrington St., Rochester
Solley, Dr. John B., 968 Lexington Ave., N. Y. C.
Stephen, John W., Syracuse, N. Y. State College of Forestry
Teele, Arthur W., 120 B'way, N. Y. C.
Tucker, Arthur R., Chamber of Commerce, Rochester
Tucker, Mrs. G. B., 110 Harvard St., Rochester
Tucker, Geo. B., 110 Harvard St., Rochester
Vick, C. A., 142 Harvard St., Rochester
Vollertsen, Conrad, 375 Gregory St., Rochester
Waller, Percy, 284 Court St., Rochester
Whitney, Arthur C., 9 Manila St., Rochester
Whitney, Leon F., 65 Barclay St., New York City
Wile, M. E., 955 Harvard St., Rochester
Williams, Dr. Chas. Mallory, 4 W. 50 St., New York City
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North Carolina

Hutchings, Miss L. G., Pine Bluff
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Ohio

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Dayton, J. H., Storrs & Harrison, Painesville
Fickes, W. R., Wooster, R. No. 6
Jackson, A. V., 3275 Linwood Rd., Cincinnati
Ketchum, C. S., Middlefield, Box 981
Pomerene, Julius, 1949 East 116 St., Cleveland
Ramsey, John, 1803 Freeman Ave., Cincinnati
Truman, G. G., Perrysville, Box 167

*Weber, Harry R., 123 East 6 St., Cincinnati
Yunck, Edward G., 706 Central Ave., Sandusky

OKLAHOMA

Beitmen, Dr. C. E., Skedee

OREGON

Frost, Earl C., Route 1, Box 515, Gates Rd., Portland
Marvin, Cornelia, Librarian, Oregon State Library, Salem
Nelson, W. W., R. No. 3, Box 652, Portland
Pearcy, Knight, 210 Oregon Bldg., Salem

PENNSYLVANIA

Althouse, C. Scott, 540 Pear St., Reading
Balthaser, James M., Wernersville, Berks Co.
Bohn, Dr. H. W., 34 No. 9 St., Reading
Bolton, Chas. G., Zieglerville, Pa.
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Clark, D. F., 147 N. 13 St., Harrisburg
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Jenkins, Charles Francis, Farm Journal, Philadelphia
*Jones, J. F., Lancaster, Box 527
Kaufman, M. M., Clarion
Leas, F. C., Merion Station
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Rose, William J., 413 Market St., Harrisburg, "Personal"
Rush, J. G., West Willow
Russell, Dr. Andrew L., 729 Wabash Bldg., Pittsburgh
Shoemaker, H. C., 1739 Main St., Northampton
Smedley, Samuel L., Newtown Sq., R. F. D. No. 1

Smedley, Mrs. Samuel L., Newtown Sq., R. F. D. No. 1
Smith, Dr. J. Russell, Swarthmore
Spencer, L. N., 216 East New St., Lancaster
Taylor, Loundes, West Chester, Box 3, Route 1
Walther, R. G., Willow Grove, Doylestown Pike
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Wolf, D. D., 527 Vine St., Philadelphia

South Carolina

Kendall, Dr. F. D., 1317 Hampton Ave., Columbia
Shanklin, Prof. A. G., Clemson College
Taylor, Thos., 1112 Bull St., Columbia

Tennessee

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Utah

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Wisconsin

Lang, Robert B., Racine, Box 103
Patchen, Dr. G. W., Manitowoc

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†Honorary member
*Life member

CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings.—The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay two dollars annually, or three dollars and twenty-five cents, including a year's subscription to the American Nut Journal. Contributing members shall pay five dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

PROCEEDINGS

at the

THIRTEENTH ANNUAL CONVENTION

of the

NORTHERN NUT GROWERS ASSOCIATION

Rochester, N. Y., September 7, 8 and 9, 1922

The convention was called to order at 9:40 A. M., Thursday, September 7, 1922, by the President, Mr. James S. McGlennon, of Rochester, New York, at the Osburn House, Rochester, N. Y.

THE PRESIDENT: This is the thirteenth annual convention of the Northern Nut Growers' Association. We have been favored by Rev. Dr. Cushman in consenting to give the invocation.

Invocation by Rev. Ralph S. Cushman.

THE PRESIDENT: I believe I voice the sentiment of all present in saying that we are grateful to Dr. Cushman for his prayer and I personally extend to him my sincere thanks and on behalf of the association.

I have the great honor and the rare privilege of introducing to you our Mayor. He has very kindly consented to come here and make an address of welcome to this association.

MAYOR VAN ZANDT: Mr. President and ladies and gentlemen, members of the Nut Growers' Association: Your President has said I was going to make an address; I never did such a thing in my life. I am glad to welcome you to the city of Rochester; I hope your meeting will be profitable and so pleasant that you will want to come again. I believe there are very few people in Rochester who know anything about nut growing. We have a splendid exhibit here from our parks and one that I am very proud of and we have a man here, Mr. Dunbar, that we are very proud of; he is a wonder; I confess that I didn't know there were so many nuts to be found in the parks myself — that is no joke. It is a wonderful thing, it is a revelation to me, I never dreamed that you could find such things growing around this part of the country at all. I fancy that most people don't know anything about nuts at all, except the five-cent bag of peanuts. I certainly wish you success in every way and particularly with reference to the plantation that I understand has been started here close to Rochester where they are doing some wonderful work. Most of us have the idea that nuts are used by people to put on the table for dessert at Christmas time and but little appreciate their true food value.

I sincerely trust that you will all come again, that you will have pleasant weather and that you will have time after work to see

something of our beautiful city. We think it is the most beautiful one in the country. Thank you. (Applause.)

THE PRESIDENT: If you can wait just a minute, I am going to ask for a reply to your address of welcome. Mr. Patterson comes from Albany, Georgia, and is probably the biggest producer of pecans in the world. Mr. Patterson is a member of this association and has very kindly consented to come all the way from Georgia to be with us.

MR. PATTERSON: Mr. President, Mr. Mayor, ladies and gentlemen: I wonder if the President in saying I was the biggest nut grower in the world had any reference to my physical proportions. You have certainly a wonderful exhibit here, Mr. Mayor, of the products of your parks and you have reason to be proud of it, as you have for many other things in the city of Rochester. It has been my privilege to make short visits to the city, my wife having some relatives here. I said to my cousin this morning, if there is any place outside of the South where I would rather live, it would be Rochester.

The nut proposition is in its infancy and we all believe, those of us who are wholly nuts, that it will grow into a giant. We have a little giant in the south in the shape of the paper-shell pecan and we are expecting that this Northern Nut Growers' Association will, within the next few years, develop some varieties of nuts, or discover some varieties of nuts, that are adapted to this northern climate and will do for the northern states, the northern, eastern and western, what the pecan is promising to do and really is doing for the South. While not a native of the South I think I may extend the cordial greeting of the South to you in the North. There was a time when a northerner like myself who moved into the South had just one name and that was a "damned Yankee", and a good many people through the South thought that was one word, but that time has passed and they are welcoming in the South today the northerner who comes with an honest purpose of helping develop that wonderful country. The day of bitterness is fast passing away, so I bring to you not only the greetings of the southern nut growers, but of the South and I bring to the Mayor, and through the Mayor to the citizens of this beautiful city, the greetings of the membership of this association. (Applause.)

THE PRESIDENT: I am very grateful to you for your consideration of my impromptu request.

THE MAYOR: I will promise to give an order to the policemen to crack no nuts while the nut growers' association is in town. As to the 18th amendment, I think that nuts are about the only vegetable that I know of that they are not making hootch out of at the present time.

THE PRESIDENT: I feel that we have been particularly favored not only in receiving an address of welcome from our Mayor, but also in having with us the President of our Chamber of Commerce,

who has kindly consented to come and welcome us also. It gives me distinct pleasure to call upon the president of our Chamber of Commerce, Mr. James W. Gleason.

Mr. Gleason: Mr. President and ladies and gentlemen: On behalf of the Rochester Chamber of Commerce, I certainly want you to know that we appreciate the honor and privilege of having this convention held in Rochester. I don't know of a convention that has come to Rochester that should be more welcome on account of the scientific nature of your work and the magnificent aims and purposes of your organization in extending the planting of trees and the culture of your product. I know the Mayor has extended to you a welcome for the city but we have one citizen here in Rochester, Mr. George Eastman, of whom we are very proud because of the unselfish work that he has done, and in the work that you are doing you can appreciate what he is doing in a larger way than is given to most of us to be able to do. This week saw the opening of the famous new five million dollar Eastman Theater, dedicated to the public, and I believe the motto over the door is "For the enlargement of community life". Now, Mr. Eastman wants the people to consider this theater as their own, and that means you, that means all of us here. He would like to have the people from Rochester and the people from out of town take advantage of this magnificent structure, the wonderful orchestra, probably the finest thing of its kind in the world.

I won't make an extended address but I can promise that if you can come to the Chamber of Commerce we will make you all welcome. Thank you. (Applause.)

The President: Mr. Weber of Cincinnati has kindly consented to make a reply to your address.

Mr. Weber: Mr. President and Mr. Gleason: We really know each other as old friends, for some years ago we had our convention here and we are very glad to have it in your city again. Such bodies as yours, the Chamber of Commerce, can further the activities of the Northern Nut Growers' Association and what it stands for in the North; which is demonstrated by the exhibits shown on the table. I see at both ends of the table exhibits that show what can be done in this community in particular in the way of nut growing. Right out behind us there is one of the largest English walnut groves in this part of the country. I think it has 228 trees. The mistake the gentleman made who planted them was that he didn't plant grafted trees. Had he planted grafted trees he would have had a gold mine right there on his farm. Mr. Vollertsen, one of your citizens, has begun an industry which in time may become another one for your Chamber of Commerce to look after. We appreciate your very fine exhibits, we are glad to be here with you and thank you for your address of welcome. (Applause.)

The President: According to the program the next feature is your president's address. I feel that it is unnecessary for me to even

attempt to add anything to what His Honor, the Mayor and President Gleason have said relative to our wonderful city. It is one of the great cities of the world.

THE SECRETARY: What is the population of Rochester?

THE PRESIDENT: Over 300,000.

To Members of The Northern Nut Growers' Association:

GREETINGS:

Your President recommends that definite action be taken to the end of increasing our membership, to the still further end of exemplifying the truth of the old saying that "in union there is strength." More members mean the spreading of our gospel over greatly increased areas that should be interested in nut culture. The present membership is approximately 250, an increase of only 24 since the Lancaster Convention in October last year. And while it is also an old and true saying that "self praise is no recommendation," the fact remains that 18 of these new members were secured through my office.

It has been suggested at previous conventions that a systematic campaign for members can be perfected through organized co-operation by our State Vice-Presidents. I believe this to be the most efficacious medium through which the greatly desired results can be obtained. Of many, I am sure, systems that can be employed to such end there are two that always appeal to me as most desirable. Doubtless you all have thought of them at some time or other; in fact I have heard at previous conventions casual mention of the second. But the first I have heard little if anything of, and it is that effort should be exerted to interest women more actively in nut culture. We have a few women members. Why shouldn't there be as many women as men? I can think of no reason why there shouldn't. I believe that women are just as competent as men to conduct any feature of nut culture, with the possible exception of specific manual labor. And I can think of no more delightful vocation for women who love the great and wonderful outdoors — and where is the woman who does not? — than nut culture, the cultivation of nut trees and bushes, beautiful things not only for the grace and beauty of trunk and limb, foliage and flower, but for their real substance, their fruit, nuts, one of the most nutritious foods for human beings. More and more nuts are being consumed every day, and I venture to say that their consumption as a leading item in our dietary is only in its infancy. So I feel that here is another opportunity for our women to demonstrate the justice of her recent acquired suffrage in our national affairs.

The other possible source of membership I have in mind is a systematic campaign to enlist the interest and co-operation of school teachers. Just think of the possibilities of such a campaign. School teachers, every one, being the high-class people they necessarily are, would respond finely, I'm sure, and serve as a most desirable medium

through which that very potent additional force can be reached, namely, the pupil. What parent would refuse a child's request to enable him or her to participate in the planting of a tree! Recently I cut out the following little poem, by Charles A. Heath, from my old-home-town Canadian paper:

THE MAN WHO LIKES A TREE

I like a man who likes a tree,
He's so much more of a man to me;
For when he sees his blessing there,
In some way, too, he wants to share
Whatever gifts his own may be,
In helping others, like a tree.

For trees, you know, are friends indeed,
They satisfy such human need;
In summer shade, in winter fire,
With flower and fruit meet all desire,
And if a friend to man you'd be,
You must befriend him like a tree.

A beautiful sentiment, I know you will agree, and applicable to any tree, but especially so to nut trees, for the reason that they combine all the laudable qualities enumerated plus that of food — food for man — one of the very finest of foods for man.

There are, of course, numerous other ways that can be employed to get new members. Another I might mention is that of offering suitable prizes; but I urge you to action, definite and specific, along this line, that our Association may better ably execute the worthy ambitions in which it was founded in 1910.

Then, again, more members mean more money. With more money we can get along faster. "Procrastination is the thief of time," you know. I trust that real action will be taken at this convention to the end of increasing our membership to at least one thousand by the time of the 1923 convention. It can be done — yes, easily. If only each member would pledge himself or herself to get three new members during the year the 1923 convention would find us with the desired membership; and I am sure that a considerable excess would be found on the roll at that time.

Also, increased membership is desirable to the end of increasing subscriptions to, and widening the scope of our official organ, The American Nut Journal, the only publication of the kind in the country. Under the able editorship of that Roman, one of our most earnest and intelligent members, Mr. Ralph T. Olcott, it is a power for good in the interests of nut culture. It can be made an even greater power with a materially increased subscription list, and I know that I speak for my friend, Olcott, when I say that he is ready

and willing to expand the Journal's columns as will be required, of course, by the expansion of nut culture — I believe I voice the general sentiment of our membership when I say that no more welcome messenger comes to us each month than the American Nut Journal.

Another recommendation I am going to offer is, that the association consider the advisability of establishing a nursery at a point agreed on as best adapted for the propagating and nursing of such nut trees and bushes as it endorses as suitable and desirable for the area of country naturally governing the origin of our title — Northern Nut Growers' Association. This recommendation germinated in my thought from a casual remark made to me recently by our esteemed member, Mrs. W. D. Ellwanger, while I was a visitor at her charming summer home, Brooks Grove. Viewing her nursery of several thousand black walnut seedlings she casually mentioned that she would be very happy to present to any one desirous of planting such trees any consistent number he or she desired. As my thought dwelt on the expression of such a splendidly magnanimous nature I began to wonder, if a lady was willing to perform such a noble act, why should not the association elaborate on the worthy plan along the lines I have suggested. And with more members, and, thereby, more money, we can do it. Then The Northern Nut Growers' Association will be doing a real thing, something tangible, something that will attract new members in a way nothing else would, because people would then be able to see the living evidence of the practicability of our ideals. We could start in a small way, and grow. After long and earnest thought on the subject I came to the conclusion that it was worthy of our consideration.

From Mrs. Ellwanger's reference to "Johnny Appleseed" I believe that she found precedent for her nut tree nursery initiative in the work of inestimable value to posterity done by that same worthy. If the legend be true, he worked with much happiness of heart, but not more so than that of Mrs. Ellwanger, I am sure you will agree, when I tell you that many of her nursery trees are growing from nuts she garnered from roadside and field trees manifesting some exceptional trait, or indicating rare strain.

And I cannot refrain from urging action to the end of influencing our other states to pattern after good old Michigan in our effort to enact legislation, as she has done, providing for planting our roadsides with nut-bearing trees. It is something tangible, like this, that really counts. I believe that it is a fundamental of life, and living, that precedent, pro or con, is invaluable as governing subsequent action along similar lines. Here we have, in Michigan's action, a most worthy precedent, and I can think of no good reason why OUR other states should not do likewise. And I believe that this association, functioning efficiently, can exert the necessary influence to bring about a similar condition in OUR other states. My emphasis of the word OUR means The Northern Nut Growers' Association's states, you know.

I just wish to mention in passing that the author and collaborator, respectively, of the Michigan roadside planting of nut trees legislation are our esteemed members, Senator Harvey A. Penny and the Hon. William S. Linton, both of Saginaw, Mich.

In closing I desire to refer to our wealth, as an association, in scientific lore. The association is particularly well equipped in having a faculty, so to speak, than which there is none better in the country — yes, the world — in whose hands our recommendations, to the planter of nut trees, can be entrusted with absolute safety. For genuine scientific research in nut culture of the northern states this association stands singly and alone. This tribute is born of vivid remembrance of the really scientific work done by several of our worthy members, notably, Jones, Bixby, Morris, Deming and Vollertsen. Them, especially, I salute. (Applause.)

Mr. Olcott: With reference to the suggestions in the President's address, why wouldn't it be desirable to refer them to a committee to report upon and take any action that may be desired?

The President: I believe, Mr. Olcott, that is a good suggestion.

Mr. Olcott: I move that the President's address be referred to a special committee to consider and report at a later meeting in respect to the suggestions made and the plans for carrying them out. Motion seconded by the Secretary and carried.

Committee appointed: The President, Mr. Olcott, Dr. Deming, Mr. Bixby and Mr. Jones, to report Friday evening.

The President: The next feature of our proceeding is the report of our secretary, Dr. William C. Deming of Hartford, Conn.

The Secretary: Mr. President, I beg to say that the secretary has no formal report; but I have a number of items that will be of interest to the association which we can take up at this time if you think best. I think first should be taken up the notices of two members who have died this year, both of whom were very prominently connected with nut growing, Dr. Walter Van Fleet and Col. C. K. Sober. I will read a notice of Dr. Van Fleet's death which has been especially prepared for us by Mr. Mulford of the United States Department of Agriculture.

DR. WALTER VAN FLEET

In the death of Dr. Walter Van Fleet on January 26, 1922, the United States has lost one of the greatest plant breeders in its history, and garden rose growers an ardent advocate and sincere friend. Since a lad he had been interested in these lines of work and the products of his unremitting and painstaking energy, combined with unlimited patience, are known by garden lovers all over the counry, as well as in Europe.

Rosarians naturally know him best by his roses, of which there were many, among them that splendid variety that bears his name, as well as such others as Silver Moon, American Pillar, and Alida

Lovett. Many more are still in the trial grounds of the United States Department of Agriculture at Bell Station, one of which, christened Miss Mary Wallace, will be available in two or three years.

The ideal rose for which he was striving, in all his later work, at least, was a garden rose, with foliage that would compare in healthfulness and disease resistance with the best of the rose species, that would be hardy under ordinary garden culture, and that would be a continuous bloomer. His experience taught him what would be likely to give the desired results, but often he could not come directly to the ends sought. For example, when he wanted to combine the characters of some newly found species with the Hybrid Tea roses, he would often find the two could not be crossed directly with one another. He would then seek some other rose that would combine with the new species, without changing the characteristics which he wished to preserve, after which he would grow the resulting hybrids and cross them with the hybrid tea. Sometimes he would need to make another cross before he could get the seedlings for which he was striving. When it is realized that each cross of this kind would take from three to five years before he could take the next step an idea is gained of the patience required. Sometimes the results of these crosses would be infertile, producing neither perfect pistil nor viable pollen, as in the case of a handsome scarlet rugosa growing in the National Rose Test Garden which he was unable to use for further breeding on this account.

His great love of his work is shown in his having given up a successful medical practice in 1891 to devote all his time to plant breeding. He did this, even though he had taken a post graduate course in medicine at the Jefferson Medical College in Philadelphia in 1886-7, after having graduated at the Hahneman Medical College in the same city in 1880. His first work after this change was primarily with the gladiolus on a farm between Alexandria and Mount Vernon, Va. The soil was not adapted to his purpose so he abandoned it and went from there about 1892 to the Conard and Jones Company of West Grove, Pa., then to Little Silver, N. J., and in 1897 to the Ruskin Colony in western Tennessee as the colony physician.

In 1899 he became associated with the Rural New Yorker and lived at Little Silver, N. J., where he continued his breeding work on his own place. As associate editor for the following ten years and as writer of the column of " Ruralisms " in this paper he has left much valuable information on plant life and plant growing. From 1902 to 1910 he was also Vice-President of the Rural Publishing Company. While at Little Silver he was breeding fruits, roses, chesnuts, lilies, freesias, azaleas, and other ornamentals.

In 1909 he went to the Plant Introduction Gardens of the United States Department of Agriculture, at Chico, Cal. As the climate did not agree with his wife, he remained at Chico but a year and moved to Washington, D. C., where his official work was with drug plants

and chestnuts, but his own time was largely devoted to breeding work with a wide range of other plants, a continuation of much of the work he had been doing at Little Silver. The move to Chico, Cal., resulted in a great loss to his breeding work. Some of his material was left at Little Silver, much of it died in the uncongenial climate at Chico, and other promising plants were lost in the long shipment across the continent, both going and coming.

In 1916 he was transferred to the office of Horticultural and Pomological Investigations where he was permitted to devote himself to plant breeding along such lines as looked promising to him, while at the same time he continued his work with chestnuts and chinquapins and a few drug plants.

Dr. Van Fleet was born at Piermont, N. Y., June 18, 1857. His early years were spent on a farm but later he lived at Williamsport, Pa. In early life he made a study of birds, his first book being "Bird Portraits," published in 1888, apparently being a reprint of magazine articles, one of which dates back to 1876. He was also a successful taxidermist, having studied under Maynard, and trained several of the leading taxidermists of his generation, including Charles H. Eldon of Williamsport, Pa. At nineteen he spent a year in Brazil, first connected with a party constructing a railroad around some of the rapids of the upper Amazon, and later in connection with the Thomas scientific expedition collecting birds and plants.

August 7, 1883, he married Sarah C. Heilman of Watsontown, Pa., who was associated with him in his medical practice and in his breeding work, and has been a sympathetic and helpful companion, and who survives him.

His was a most lovable personality. Those who came into contact with him day after day appreciated best his sterling qualities. He was kindly and considerate and nothing was too much trouble, and yet he had an intolerance of hypocrisy and cant that was almost violent. He was steadfast of purpose and there is nothing that shows this better than his lifelong work in plant breeding and the ruthless manner in which he rooted out his inferior seedlings as soon as he felt them to be valueless. His likes and dislikes were strong. Above all, he was modest and retiring in the extreme. He not only avoided, but shunned publicity. He avoided the outdoor meetings of the American Rose Society in the National Rose Test Garden as much from the fear of publicity that we, his friends, could not refrain from giving him, as for any other reason. He regretted in his later years that he had given up, during his editorial career, the little public speaking that he had previously done and had gotten so out of practice that, with his disposition, he could not again take it up.

He was an amateur musician with a thorough knowledge of orchestral and band instruments, harmony, theory, and orchestration but during the last few years none but intimate frequenters of his

home had the privilege of hearing him, although until within the last two or three years he often played the violin.

In 1918 he was awarded the George Robert White Medal of Honor for eminent services in horticulture by the Massachusetts Horticultural Society, probably the greatest honor that can come to a horticulturist in this country. He had also been awarded three medals for the rose Miss Mary Wallace, a gold medal by the American Rose Society, a gold medal by the City of Portland, Oregon, and a silver trophy by the Portland (Oregon) Rose Society. He was associate editor of the magazine "Genetics" at the time of his death.

Although he was an honorary member of the association I think very few of us knew that he had such varied activities in his life as this little biography tells us he had. The death of Dr. Van Fleet has been a great loss to American horticulture and nut growing.

Also during the year Colonel Sober has died. Colonel Sober, as you know, was a man who had made a very great success of growing the Paragon chestnut. His was the first commercial success in nut growing in the North. Then the blight came along and wiped out his industry. The Colonel was loath to admit for a long time that he had the blight or that his trees were not immune and that his nut growing was going to be a failure on account of the blight. I have no biography of Colonel Sober to read but one was published in the American Nut Journal for August.

THE PRESIDENT: I feel that we ought to make some record here of our feeling for these two men. I knew them both personally. I met Dr. Van Fleet at Washington two years ago and Colonel Sober seven years ago when the convention was held here. I had a great deal of correspondence with Colonel Sober. I think that we should adopt a resolution now and send copies of it to the families of these two deceased gentlemen to let them know the high regard in which this association held them as members and men.

MR. O'CONNOR: I make that motion.

THE SECRETARY: I second that motion and ask that the President appoint a committee on resolutions, which will also cover any other resolutions that may be necessary during the course of the meeting.

(See Appendix for Report of Committee on Resolutions.)

THE PRESIDENT: I will appoint on that committee Dr. Morris, Mr. Patterson, Dr. Deming, Mr. Jones and Mr. Rick.

THE SECRETARY: I have still a number of things here that will take up a good deal of time. I don't know that it is particularly interesting to any one outside of the association but I have a letter that I think is interesting to the members, especially those who have attempted chestnut culture, from Mr. G. F. Gravatt, assistant pathologist, United States Department of Agriculture, in which he says as follows:

As you may be asked questions at the Northern Nut Growers' Association meeting at Rochester regarding chestnut blight work of the Office of Forest Pathology I am sending the following letter:

By means of short field trips and correspondents I am keeping up in a general way with the spread of the chestnut blight. The disease is steadily spreading southward and westward. Infections are now known in seven counties in Ohio and thirteen counties in North Carolina. There is every reason to expect that the disease will ultimately cover the range of the native chestnut and chinquapin.

In Ohio several orchards have been reported as infected by State authorities. The blight is now present on native and planted chestnut in a number of localities in the Northwest quarter of that state. State authorities have reported one orchard in Indiana as infected.

It is evident that chestnut orchards located in the middle west are in danger of becoming infected with the blight. The most important means of spread to localities outside of the range of native chestnut are by chestnut poles and lumber products, and by infected chestnut nursery trees. Owners of chestnut orchards should keep on the watch for the disease and any suspicious specimens will be gladly identified.

There is some disagreement among pathologists as to the practicability of controlling chestnut blight in orchards located outside of the range of native chestnut or in localities within the range of the native growth where the native trees are very scattering, such as in many parts of Ohio.

My personal opinion is that the orchardist thoroughly familiar with the disease who will systematically inspect his trees, properly remove any infection as soon as it becomes visible and who has eliminated the sources of new infection in his neighborhood has a good chance of success. Control of the disease in some orchards is being tried out and I am desirous of getting in touch with other chestnut orchardists who have infected trees.

The chestnut breeding work at Bell, Md., started by Dr. Van Fleet, is being continued. Mr. Reed is looking after points relating to culture, quality of nuts, productions, etc., while I am looking after the hybridization and disease work. The Chinese chestnut seems to be the most resistant to the disease though a number of trees of this species have been killed primarily by the blight.

A number of reports of chestnut blight becoming less virulent have been investigated but in all cases the reports were incorrect. Professor Graves is continuing his observations on resistant trees around New York City.

That, I think, summarizes the chestnut blight situation very well.

I have a letter from Mr. Reed from China; it is a long letter and I will only read from it one or two extracts which tell why he was sent to China:

My task is that of obtaining a summary of the so-called "Manchurian" walnut industry of this country. So many walnuts from here are being delivered in the States each year that our own industry is considerably affected. The extent of production, its present rate of growth and its probable character and magnitude ten years hence are things our own people needed to know. So serious is the situation that Thorp, manager of the California Association left San Francisco for over here more than two months ago to get a short general glimpse, then to go to European points for the same purpose.

The consuls here have reported that no walnuts are grown in Manchuria, except in half wild, low-grade, scattered product which is assembled in small quantities only and probably not exported. The exported nuts are mainly from the provinces of Chihli, Shantung, Shansi and Honan. Tientsin and Hankow are the chief points of export.

Mr. Reed expects to be back about Thanksgiving time. We miss Mr. Reed very much here at the conventions because he is the Government representative of the nut industry. He has a wider general knowledge of the nut industry in the United States than any other man.

In connection with the suggestions that our President has made, I think I ought to call the attention of the association again to the address of Dean Watts that he delivered at the convention last year in Lancaster. (This address, entitled "A National Programme for the Promotion of Nut Culture," will be found on page 80 of the report of the proceedings at the twelfth annual meeting.)

I have brought here a cluster of burrs from some chinkapin bushes that have been growing in Elizabeth Park, Hartford, for 23 years. They are loaded with nuts and although attacked by the blight, the fact of their being there so many years shows how resistant they are. I have also some clusters of burrs from chinkapin bushes in my own garden. They bore a full crop the second year from transplanting.

MR. O'CONNOR: Before I forget it, I want to say a word in regard to chinkapins. Right close to where I live there was a fire swept through the place and burned them down to the roots. But they have come up from the roots and are full of chinkapins at the present time; I have seen where the blight has hit them and they died back to the ground and they have shot up new shoots again and are bearing. The chinkapin is a coming nut; the school children are looking for them like I used to look for the butternuts in the early days.

THE PRESIDENT: That is very interesting information, Mr. O'Connor, and I am very glad you have stated it.

THE SECRETARY: Mr. Wycoff of Aurora, N. Y., has brought here a little branch containing two well developed Indiana pecans

grown on a grafted tree. I think that is the first instance in which a grafted pecan tree of the Indiana variety has borne in the North. Mr. Snyder says he has fruited a Witte pecan at his place. A number of us have been striving to make the record for first bearing of a grafted "Indiana" pecan tree in the North. Mr. Wycoff has won it.

Mr. O'Connor, I think, has brought with him a number of branches of pecans grown in Maryland.

Mr. O'Connor: I have some hazels and also some chinkapins.

The Secretary: Have you any pecans fruiting down there this year?

Mr. O'Connor: Several nights of frost hurt us pretty bad this spring. We have one tree that has got a few pecans on this year; last year the same tree had over a hundred; this year it hasn't got more than a dozen, but it promises to have a heavy crop next year.

The President: What variety of pecans?

Mr. O'Connor: If I am not mistaken, it is the Indiana. There are several trees that promise to bear heavily next year. In the spring we had a severe frost for seven nights in succession and that hurt our trees pretty bad. We are in the frost belt down there. Last year we didn't have any apples or peaches; this year we have some apples and some peaches but the grapes were severely hurt by the frost, also there are very few walnuts on the trees this year.

Mr. Corsan: From traveling around as much as I do I can vouch for that gentleman's statement in regard to the frost. I was up in the extreme northern part of the United Sates, northern New York, and I never saw such a crop of hickory nuts in my life and I have gathered nuts since I am able to remember. I have also seen more peaches up in Ontario and even north of Ontario. When you talk about frost and the South having such an advantage over the North, it is entirely wrong; I have had that idea knocked out of me for a good many years.

The Secretary: I wish also to say that I brought here a small branch from the Hartford pecan tree bearing two nuts. The Hartford pecan tree is undoubtedly the largest pecan tree in the North. It is about ten feet in circumference, over seventy-five feet high and has a very large spread. I will ask Mr. Weber if he will give us the account again of the finding of that black walnut in the river and tell us the result of his investigation.

Mr. Weber: Whenever I come across a black walnut I want to open it up and see what it looks like inside. Following that custom when I found a walnut that had lodged against the dyke north of the central part of the city, I was surprised when I opened it because the partitions were very thin, like an English walnut. Later on I found another similar nut lodged against the dyke of the river about a quarter of a mile along. Then through a statement in the paper and an advertising campaign we tried to locate the tree. Finally we got the name of a man in Floyd, Va., who said he knew of

the existence of such a tree, but a few years previously they had cleared the land and it had been cut down. So that finished that. But he gave me the name of the man who had owned the place and said that there were some other trees that had originated there and that they were bearing. It is down in Virginia at the extreme western end and off the railroad and rather hard to get to. I thought possibly on my way home I would get there this trip.

THE SECRETARY: As an example of nut enthusiasm here is the corporation counsel of the city of Cincinnati, who on his walks abroad picks up nuts that he finds and examines them. He finds one on the dyke of the river that he considers remarkable and in conjunction with the president of this association conducts an advertising campaign in the watershed of the river where that nut was found in order to locate the tree, and succeeds eventually in doing so.

Mr. President, here is a communication which I received in July from the Secretary of the American Pomological Society inviting us to become a member. I didn't feel that I had the authority to send him a check for ten dollars, but I would like to put before the association the question as to whether we ought not to make this association a member of the American Pomological Society. I would ask, Mr. President, that you put that matter up for discussion, if you think it is of sufficient importance.

THE PRESIDENT: I do, Mr. Secretary, and think it would materially help in gaining names in our plans for increasing the membership if we were able to say we were a member of that society. What do you suggest relative to the procedure in that connection?

THE SECRETARY: I think all that is necessary is the motion by some member that the treasurer be authorized to take out a membership for the association in the American Pomological Society.

BY A MEMBER: I so move. They will know we are in existence and if we take an interest in their work they will take an interest in ours.

Motion duly seconded and carried.

THE PRESIDENT: Your reference to Mr. Reed reminds me that prior to his receiving orders to go to China, he and Mrs. Reed both had promised to come and make addresses at this convention; Mrs. Reed on the subject of nuts as a food and Mr. Reed with a fine exhibit and also an illustrated lecture. He wrote me quite fully just before going saying he was awfully sorry that he could not be here. With reference to the Secretary's remarks regarding Dean Watts, I had the privilege of meeting Dean Watts last year at Lancaster and I think his ideas are very much along the same line relative to increasing our membership and improving our financial condition so that we can do real things. I had a letter from Mr. Littlepage early in the season and he expected to be here. Then he finally wrote me and said it would be absolutely impossible for him to come

but he was sending his able lieutenant, Mr. O'Connor. I was beginning to feel a little worried this morning that perhaps Dr. Morris might not be able to get here but I was very happy a few minutes ago to see the Doctor come in and now I feel considerably more comfortable because he is a great aid and help at these conventions. Is there anything further, Mr. Secretary, that you have in mind?

THE SECRETARY: I just want to call your attention to the exhibits; they really hardly need any one to call attention to them, but I would like to mention especially the exhibits at the two ends of the table. The one at the further end of the table by Mr. Dunbar of the Department of Parks of Rochester is really a very remarkable exhibit, especially from a scientific point of view. (See list of exhibits in appendix.) At this end of the table is a splendid exhibition of filberts grown in Rochester in Mr. McGlennon's filbert nursery under the direction of Mr. Vollertsen; it needs no word of praise from any one, it speaks for itself. Also I call your attention to these three English walnut trees in pots, each one bearing fully developed nuts, which were grown by Mrs. Ellwanger. Last of all I will mention again the cluster of Indiana pecans brought here by Mr. Wycoff of Aurora.

MR. DUNBAR: Dr. Deming didn't tell us about the Chinese chestnuts that are fruiting—the castanea mollissima.

THE SECRETARY: Dr. Morris has had them fruiting for a number of years. I don't know whether any others have or not.

DR. MORRIS: They fruit very well and are a good hardy nut. They are on limestone land.

THE SECRETARY: It is a very interesting nut.

MR. CORSAN: Out of twelve varieties of chestnuts that I planted on my place it is the only one that died. I got them in Washington. I looked after them probably too well. I will try them again to be certain they had no climatic reason for dying. It is very strange that that chestnut didn't grow. Nobody near me grows chestnuts so I can cultivate them for a good many years without any worry about blight.

DR. MORRIS: I doubt if the blight amounts to much with you. It is carried by migrating birds. Some birds will take the blight north and our friends in Canada will finally have it, so cheer up, the worst is yet to come, but it will be a good many years.

MR. CORSAN: The blight has got to the extreme northern part of the chestnut growth, that is, to the top of Lake George. The chestnut doesn't go a quarter of a mile beyond Silver Bay.

DR. MORRIS: I have found chestnut trees in Quebec.

PROFESSOR NIELSON: Speaking of the range of nut trees, I have seen the hazelnut in the Saskatchewan several hundred miles north of the international boundary and at Edmonton, Alberta, Canada.

THE PRESIDENT: That is very interesting to me for about the time that we started in experimenting with filberts I received a letter

from an old friend of mine in Canada, Mr. Edward Kennedy; he stated that he believed the hazelnut or filbert would do very well in the Canadian Northwest. At that time we were in the nursery business and were finding it difficult for our general nursery stock to survive the severe winters in the Canadian Northwest. Mr. Kennedy thought that from his observation of the filbert throughout that country it was the one item in the nurseryman's list that would do very well there.

DR. MORRIS: In that connection I would like to say that I have seen the hazelnut growing as far north as Hudson Bay and it is very hard to distinguish it from the elm. The hazelnuts grow to a height of from twenty to twenty-five feet and the elm comes down to about that height. The leaves look so much alike that I found myself looking for hazelnuts under an elm tree.

THE PRESIDENT: Mr. Patterson told me that while fishing on one of the streams near Albany he had found some of the common hazelnuts in fruit. I have sent down to some of my friends at Albany some of our filbert plants to see how they might do there and the reports up to the present time have been altogether favorable. My thought up to the present time has been that perhaps the climate there is a little too hot.

The next item on our program is the report of the treasurer, Mr. Willard G. Bixby of Baldwin, N. Y.

NORTHERN NUT GROWERS' ASSOCIATION

In Account With

WILLARD G. BIXBY, *Treasurer*

Receipts:		
From annual members, including joint subscription to American Nut Journal	$222.25	
From contributing members, including joint subscription to American Nut Journal	80.00	
From contributions	357.50	
From advertising in report	5.35	
From sale of reports	12.00	
From sale of Bulletin No. 5	8.58	$685.68
From Life Membership W. L. Linton		50.00
		$735.68
Deficit September 1, 1922:		
Balance Special Hickory Prize	$ 25.00	
Balance Life Memberships	95.00	
Deficit for regular expenses	176.87	
Net deficit		56.87
		$792.55

Expenditures:		
American Nut Journal — their portion of joint subscription	$ 74.00	
1921 Convention	71.46	
Printing report 12th meeting	212.19	
Printing and stationery	142.82	
Nut contest	111.01	
Postage and express	5.00	$616.48
Deficit October 1, 1921:		
Balance Special Hickory Prize	$ 25.00	
Balance Life Memberships	45.00	
Deficit for regular expenses	246.07	
Net deficit		176.07
		$792.55

The work of the treasurer for the past year has not been satisfactory to him.

The amount of attention he has been able to give it has been much less than he had hoped. While supposed to be retired with nothing to do except just what he wants to this is far from the facts. While it is true that in 1919 he did retire from business, in which he had spent practically all of his time since leaving school, he has never been able to retire entirely and is still president of one corporation and vice-president of two. In the case of one of these the conditions under which it operated have changed so entirely that he has had practically to get back into business and the work of the association has had to be sandwiched in as best it could and at times has had scant attention. Had it not been for Mrs. Bixby's help on the work of the treasurer proper, he would have had to resign.

There is a deficit* shown by the treasurer's report although less than that of a year ago. The attempt to induce a rather large proportion of our members to become contributing members, paying $5.00 per year as membership fee, including subscription to the American Nut Journal, has been reasonably successful, about one-quarter of our receipts of membership fees being from this source. The real difficulty, however, is that our total membership is not sufficient to enable receipts from dues to pay expenses. In every year, for a good many years, receipts from contributions have been about equal to those from dues and apparently that condition will have to continue until our membership is doubled, unless the activity of the association is materially reduced, which course seems inadvisable to your treasurer.

The results of the nut contest the past year have been unsatisfactory. The nut crop was a failure over quite a portion of the country covered by the association. The number of nuts sent in was

* This was wiped out at the meeting by contributions and guarantee of new membership which more than equalled the amount of the deficit.

not over one-tenth of those received in 1920 and no nuts of notable excellence were received. Were it not for the fact that this year promises to be a great year for nuts in the northeastern United States, one might think that the nut contests had outlived their usefulness. They have, however, brought us so many good nuts and are so comparatively inexpensive that your treasurer would not want to give them up yet.

During the past year an earnest effort was made by the treasurer to get new members by getting nurserymen to enclose in their catalogs circulars regarding the association as well as membership application blanks, over $100.00 being expended on this item. The nurserymen on the accredited list responded heartily. The results, however, were far from being as satisfactory as a year ago when the literature sent out by the nurserymen simply called attention to bulletin No. 5. Literature regarding the association and membership application blanks were inserted in bulletin No. 5 and between five and ten per cent. of those who received bulletin No. 5 became members, the number being considerably greater than those from similar efforts this year.

This shows conclusively that direct appeals, unless there is personality behind them, do not have much force. A year ago bulletin No. 5 in the possession of one interested enough to purchase it, supplied the personality and gave force to the appeal that was lacking this year.

Thirty-eight new members have joined the association since the last report, making 561 since organization, of whom we have 249 at present, making 312 who have resigned, or dropped out, or have been removed by death. The additional members obtained this year are largely due to the personal efforts of the president and those in his office.

During the past year we have lost by death our only honorary member, Dr. Walter Van Fleet of the United States Department of Agriculture, and one life member, Col. C. K. Sober of Lewisburg, Penn.

Respectfully submitted,
WILLARD G. BIXBY, *Treas.*

THE PRESIDENT: I feel that we have got to get busy and get some more members and more money. At nearly every convention a deficit is reported; it ought to be the other way, and it can be. We will all agree, I believe, those of us who are in the habit of attending these conventions, that they resolve themselves largely into meetings of a mutual admiration society. Outside of Dr. Deming, Mr. Bixby and one or two others, there is very little thought given to this association during the year except immediately prior to the convention. Of course, we can't get ahead very far that way. Ever since I have been actively connected with this association I have given first thought to the matter of membership and the improvement of our

finances. I do hope that at this convention some definite and specific action will be taken so that a year from now there will be a decided increase of members, because I am confident we can do it if we put our shoulders to the wheel. Then we will have a surplus instead of a deficit. As I said in my paper this morning, the association is engaged in scientific work, but we are not going to get very far along unless we have more money, and we can't get more money unless we get more members. We ought to put our shoulders to the wheel and pull this association up to a membership that is worthy of its title. If each member would get from three to five new members during the year we would have a membership in the neighborhood of a thousand another year and that would give us a surplus of money. I hope that definite action will be taken at this convention to stimulate that development of the association. If any of the other members have anything to say on that subject I would be very glad to hear from them.

Mr. Olcott: I think that the membership is really one of the most important things for this association to consider. But I do not think it would be well to go away from this convention with only the idea that each member should try to get three or four others. That is all very well and it would mean considerable IF they would do it. I think there are enough business men here and brains enough here so that if this matter were referred to a good big committee that would spend some time on it, and before we go would report some definite way of stimulating interest in nut culture and in this association, that it would bring the membership up to a point where it could accomplish something in a business way. It is not a matter for individual action but a matter for association action. It needs publicity and a good comprehensive plan. The money will come a more members come. The wider knowledge of what this association is doing for an active membership would make a bigger membership. If you will remember President Linton suggested that each state should provide twenty-five to fifty members; it does seem as though there should be twenty-five or fifty members, men and women, in each one of the twenty or so northern states. If there were fifty there is a thousand members in the twenty states. He pledged, I believe, twenty-five names from Michigan on his own account; I don't know whether he made good or not but the plan is good to aim at fifty members in each of twenty states.

Mr. Spencer: I am very much interested in the production of nut trees largely as a matter of curiosity. My home is in Decatur, Ill. Illinois has 56,000 square miles, 30,000 square miles of that state are, or were, covered with hard wood timber. In Bureau County the hickory, the hazel, the walnut and butternut grow with a great deal of vigor; less than two blocks from me there is an ordinary sweet chestnut brought from the East by a gentleman a great many years ago. I measured it last fall and it is six feet nine inches in circumference, it has a spread of about sixty feet and it is

about seventy-five feet high. The neighbors told me that they got a bushel of chestnuts every year off that one tree. I presume if they took better care of it and gave it some fertilization they would get more than that. I happen to be the chairman of the tree committee of the Bird and Tree Club. The city of Decatur purchased 42 trees and planted them in seven parks of the city of Decatur; members of the Bird and Tree Club came to me for advice and last year I placed 114 trees for them. They placed a number of trees with the Oberlin Conservatory of Music, chestnut trees, and they planted them on the campus. I believe that persons who are associated with different clubs would take up the matter of nut growing. That means that you can interest the children and if you can interest the children then you get the parents interested. In Macon County alone the county surveyor told me there are 20,000 acres of ground that are absolutely worthless except for pasture because they form bluff land along the Sangamon river. It isn't a large stream, I suppose down here you would call it a creek, but the city has put a dam across the river and trees were planted. I tried to create a sentiment to have that shore planted with nut trees instead of ash and elm and the various trees that can bear nothing but leaves, but the hardest thing in the world is to start a new idea.

An ordinary crop of nuts after a tree commences bearing is worth a great deal more than a crop of wheat or oats and in the meantime you can use the ground under it if you want to.

Now these are simply my individual efforts in Macon County to get people interested in nut-bearing trees. It is a hard road and I am like some other people, I don't like to be pointed out as a crank, but I am pretty near that on this subject. With the co-operation of Mr. Reed a year ago I delivered an address, illustrated with pictures that were supplied by the Bureau of Plant Industry, on the subject of "The Value of the Nut Trees for Shade and Food," with the idea of having farm homes made beautiful by trees and attractive by the fruits thereof to keep the children home. Last year I delivered an address on "Nut Trees and Roadside Planting," also illustrated by pictures sent me by Mr. Reed and through the courtesy of McMillan & Company I reproduced pictures describing Dr. Morris's new way of grafting. If you will take steps along those lines and work through the Bird and Tree Clubs and get the children interested I believe you could do something toward spreading the gospel of nut culture. I thank you for your attention. (Applause.)

Mr. Corsan: As to getting new members, I am ashamed to say that since I joined in 1912, I just got one new member actually into the club and that was Dr. Kellogg. I interested hundreds of people but he was the only person I got in. The only way to do is to step right up and ask a man for his money as soon as you give him the proposition. Now that is where I fail. I struck Mr. MacDonald, the permanent Boy Scout Director, 200 Fifth avenue, New York City. He is very enthusiastic but he hasn't come in as a mem-

ber. Then the Overseer of the Boy Scouts, a tall young fellow with sandy hair and a good complexion, I have forgotten his name, but he is a splendid fellow. He was enthusiastic but he hasn't come in as a member. I met Mr. McLean of the Orphan's Home and he is going to have the Orphan's Home planted with nut trees, but he didn't join the society. I suppose I didn't beg them enough. I suppose I should say, "Give your money to me right now, immediately, and let me send it over to Mr. Bixby." I think that would be the best method of getting in new members. Then they will read the literature and keep in touch with the association. I must confess downright negligence for not getting members into the association. I thought we were a kind of a rich gang and don't need money. But we have got to have money in order to get people into the idea of growing nut trees.

THE PRESIDENT: What seems to be the objection?

MR. CORSAN: No objection at all except I had that fault of not gathering in their membership while I was speaking to them upon the possibilities of nut culture.

THE PRESIDENT: If you don't get some members in this year there will be trouble!

MR. CORSAN: Why not give a tree with every new membership so that the member can plant a nut tree on his own farm, and the Boy Scouts and also the Girl Scouts would come into this thing, too, as the tall gentleman from Decatur has said.

MR. PATTERSON: I should like to tell you what happens in our association in the south of Georgia. For a number of years our treasurer has come up with a deficit each year. The only practical way that we have found in the southern nut growers' association for increasing our membership and getting additional funds is to do it by subscriptions taken at the meeting. Let each man pledge so many members and turn over the money to the treasurer to pay up for the members that he has pledged. Then let him go out and get the members to reimburse himself. In that way we have increased our membership very much. I do not say that that is the way that it should be handled here but that is the only way we have found of solving the problem.

MR. TAYLOR: I represent the Northern Apple Growers' Exchange. We want to get people who grow apples into our association and the first thing of all is to get them interested. You first have to attract the attention of a man, your prospective member, and then you have to arouse his interest and you have to create a desire. We found that in order to attract his attention a circularization of people who were eligible for membership accomplished a great deal. These people were circularized, given little bits of information here and there, not the information that was given the members as a rule, not to that extent, but they were given a certain lot of information from time to time to let them know that the Apple Growers' Exchange was there. After a while they were approached personally

and if they said "No" we continued circularizing them a little while longer along a different line. Finally, when we thought we had gotten them to a point where they were interested, the problem was to get them properly signed up. So we then made a drive for those particular individuals by showing them what they could personally get out of it. After he had joined our problem was to hold him, to keep him interested until he became enthusiastic. Unless you keep them interested they are liable to cool off, and once they are cooled off it is almost impossible to get them interested again. We find the members who have gone out are the hardest to get back. A way of keeping that new member in, and helping him to feel that he is a potent factor in the organization, might be by having some sort of a special communication with him at the time he joins, or at the next meeting of the association. I know that in California that is the way they work it. Keep members informed, not merely with reports of proceedings but with something like an occasional sheet or two on the latest thing that is going on, especially for the new members. (Applause.)

THE PRESIDENT: I would like to have any other suggestions. Dr. Morris, have you anything to say?

DR. MORRIS: No, I have been doing a lot of thinking.

THE PRESIDENT: It seems to me it is the one vital thing for us to consider. We have got to increase our membership.

MR. OLCOTT: Apropos of the remarks of Dr. Taylor comes the question of the desirability of giving a prospective member something for his money. Our first problem is to interest someone to the extent of membership and then to keep him after we get him. Those are problems that require thought. I think the President in his address suggested that the association produce young nut trees to be given away to someone to plant, to interest that someone and others who see it. Would you give him another tree at renewal time?

THE PRESIDENT: That was the idea.

MR. OLCOTT: The renewal proposition with trees selling at $2.50 to $3.00 apiece would be pretty expensive for the association — for a member to pay us $2.00 and get a tree for nothing. My personal idea has been that there should be a state organization in every one of the northern states, subsidiary to this association; that each association have its monthly meeting, or maybe quarterly or annual, taking in those who cannot find it convenient to come to the parent association's convention.

DR. MORRIS: I will pay the dues, and subscription to the Journal, for any Boy Scout for ten years if you will make that the object for striving for a prize in some organization of Boy Scouts.

THE PRESIDENT: I appreciate that very much.

THE SECRETARY: I have two suggestions for ways of drawing attention to our association. The first is lectures. There are a number of our members who have given lectures on the subject of

nut growing. Mr. Spencer has just told you that he has and Dr. Morris loses no opportunity to give them. I have given them myself and Mr. Reed of the Department of Agriculture speaks on nut culture. There is hardly a member of this association but belongs to some agricultural society or club. That is one possible place for bringing nut culture to the attention of people who are interested in either agriculture or horticulture. I am sure that Mr. Reed of the Department of Agriculture will send a collection of lantern slides on nut growing to responsible persons. These slides make lecturing much easier. I will undertake to get Mr. Reed to make up a collection of slides to be sent out to members for the purpose of illustrating lectures. My other suggestion is the writing of articles for magazines, horticultural and agricultural, and especially high-class horticultural magazines that reach wealthy people who are interested in new things and in trying experiments, such as the Country Gentleman, Country Life in America and the Garden Magazine. What we really want is some person who will give himself continuously to the promotion of this nut-growing idea. It is a great misfortune that Mr. Bixby has taken up business again because he made a splendid beginning in devoting himself to the interests of nut culture. I did a great deal more myself in the earlier days of this society but circumstances have been such that lately I have not given it much attention. I feel that there must be members who are all ready to do work, members who would like to jump in and take a hand. I would be very glad to share my work as secretary. I would be glad to hand over the entire work of secretary to some member who feels an itch to get in and do this sort of work.

The President: You are very liberal in your service but I think others ought to take a bigger share so that your duties will be easier and also Mr. Bixby's. Now that we have this thing going I hope we will stick to it until we get something concrete because I can't see that we are going to make much progress just meeting from year to year with an increase of twenty to twenty-five members. I personally will guarantee a hundred members for this year for this association. I speak advisedly because I know what we have been doing in our office this last couple of months. I am satisfied that I can bring to the association a hundred new members this year if the rest will bring ten each. We have got to get more members and more money; let's get down to bed rock and look the thing squarely in the face and make up our minds to go to it and do it.

Mr. Corsan: Where can these slides be got?

The Secretary: I will undertake to furnish them through Mr. Reed of the Department of Agriculture. There is also a good moving picture film of Colonel Sober's chestnut grove that I think can be had. I have used it myself two or three times.

Mr. Kains: Rochester, as a good many of you know, is the center of the fruit industry in western New York. Right here is also the scene of one of the greatest fights to get an association on a paying basis that ever occurred. Some of you probably know that away back in the fifties Patrick Barry and Mr. Worter and several others of the fruit growers got together and formed the Western New York Horticultural Society. Gradually people came in and took an interest in the work but, as always in the beginning, there was trouble to make ends meet and Mr. Barry and some of the others put their hands in their pockets to keep the association going. At last it got so bad and the amount of the deficit was so great that it was decided to have a closed meeting, no one to be admitted except those who had actually paid their one dollar membership fee. The year that it was announced that this would be put into effect the following year there was all kinds of a fuss at the meeting. The next year the people came there in a crowd to see if the rule was going to be put in effect and the result was the largest meeting the association had ever had. The only men and women who got inside the door had paid their dollar. That was the first year that the association got on its feet. One other method that could be used to spread the love of nut growing would be to have the association offer a nut tree to different schools where they would plant it as an Arbor Day tree. In that way the children would learn the value of the grafted nut tree and the value of real first-class nuts. The result would be that other people would become interested in grafted nuts and thus extend the interest in the whole nut-growing proposition, and your membership would most likely increase. (Applause.)

The President: I will ask for nominations from the floor for the nominating committee.

Mr. Pomeroy, Dr. Morris, Mr. Olcott, Mr. Rick and Mr. Patterson nominated and elected.

The President: The next order of business is to call for the reports of any of the standing committees.

The Secretary: The chairman of the committee on incorporation, Mr. Littlepage, wrote me not long ago that he was taking active steps to incorporate the association. I don't know whether Mr. O'Connor may know if Mr. Littlepage has done anything about it or not.

Mr. O'Connor: I can't say about that.

THURSDAY EVENING, SEPTEMBER 7, 1922

THE PRESIDENT: I am going to ask Dr. Taylor to present his paper now, if he will please.

PROF. RALPH H. TAYLOR: Through a previous arrangement with our secretary I had assigned to me an entirely different subject from that on the printed programme, "The Use of Nuts the Year Around." I have prepared a paper on the original subject and so I will proceed to deliver it in accordance with my arrangement with him.

I do, however, want to say first, in connection with the use of nuts the year around, that we from California are vitally interested in that problem. I know of no problem that faces us more at the present time than the one of marketing the product that we grow in competition with the tremendously increasing imports from abroad, brought in from countries where labor costs anywhere from twenty to fifty cents a day, and at the highest a dollar a day for what they call skilled labor, most of it twenty to fifty cents, and with freight rates across the Atlantic that amount to less than half of our freight rates, or one-quarter of them. With the commodity in the hands of speculators who are able in various ways to make tremendous profits, and giving the public none of the benefit of these conditions, we find it almost impossible to market our product at a profit. We must get it into the hands of the consumer cheaply. We are endeavoring to do it. One of the plans is to encourage the use of nuts the year around, and the California Almond Growers' Association, whom I represent, are planning now to shell their own almonds and put the kernels up in vacuum packages, both tin and glass, and make it possible for the housewife, instead of going to the candy stores and buying salted almonds for a dollar to a dollar and a quarter once or twice a year, to secure her own almonds, blanche them herself and use them considerably more often because she can get them cheaper. We believe it is going to be worth while for us to go into the business the year around. The demand at the present time is for almonds for a brief period up to the first of January. Thereafter there is no sale until the following November. Under those conditions you can see that with increasing crops we are facing difficulties that are almost insurmountable. Therefore we are changing the form in which we are marketing part of our crop. I want to say to those people who do recognize the value of almonds for food that it is going to be possible for you to secure them in a most desirable form, clean, wholesome and absolutely fresh, as almonds packed in vacuum. They will be just as fresh as when they are put in from the orchards of California.

ALMOND POSSIBILITIES IN THE EASTERN STATES

By R. H. Taylor*

There is probably no better way to open a discussion of this kind than by asking a question and then using it as a text. The future possibilities for almond production in the eastern states can not be stated any other way than as a question. For my text I am indebted to your secretary, Dr. W. C. Deming. It is taken from a letter written by him under date of June 22nd to Mr. T. C. Tucker, the manager of the California Almond Growers' Exchange, and is as follows:

"Why can't we breed an almond that will do in the East what its sister, the peach, does?"

Any answer we might give must be, of necessity, more or less empirical in nature.

In order properly to understand that answer, and I shall attempt to give one later, certain fundamental relations and limitations must first be considered; then the possibilities of any given line of procedure may be more clearly understood.

Botanically the almond is very closely related to the peach, both belonging to the genus *Prunus,* sub-genus *Amygdalus.* The species of the peach being *persica,* and of the almond, *communis.* In fact the two trees are in many respects so much alike that it is possible to select twigs and leaves from each which cannot be distinguished except by an expert, and even he may be misled at times. Ordinarily, however, they are of sufficient difference to be readily distinguished.

In the fruit the principle difference is that the fleshy portion of the peach becomes in the almond a leathery hull which splits at maturity revealing a seed or nut, the shell of which is generally softer than that of the peach pit. The kernel may or may not be bitter, depending upon the characteristics of that particular seedling. If 100 almonds from a sweet almond tree are planted and brought to bearing it is probable that from a third to a half of them would produce bitter almonds. As a matter of fact, we have had by actual tests as high as 50 per cent. bitter. The peach, on the other hand, will, probably in 99½ per cent. of the cases, produce a seed with a bitter kernel, only very rarely a seed developing which will produce edible kernels. The same is true of the apricot, the Smyrna variety being an edible apricot with an edible kernel.

The almond is normally the first of the stone fruits to begin growth and come into blossom in the spring and is also normally the last tree to become dormant in the fall. It is evident, therefore, that its normal winter resting period is comparatively short. The peach has a much longer resting period than the almond although less than the apple, pear and other similar fruits, and it is for this reason that

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*In charge Field Department, California Almond Growers' Exchange.

peach production is possible in a commercial way in many sections of the East.

In California, where almonds and peaches are very often planted in close proximity, many seedlings are known which are very evidently natural crosses between the peach and the almond. In addition many artificial crosses have been made with no difficulty and have been planted and brought to maturity. The products of these crosses have shown the same general characteristics as those found naturally.

We are familiar with a peach-almond growing on the edge of a large almond orchard in California which produces good crops of fruit quite regularly. The fleshy portion or hull is almost edible, being much drier than the flesh of an ordinary peach and yet much more fleshy than the hull of the ordinary almond. It has a slight amount of astringency, a characteristic of the almond hull, but not sufficient to prevent its being eaten. Upon maturity this fleshy portion or pericarp splits but does not open as is usually the case with almond hulls. Inside this the pit, stone, seed or nut, or by whatever name it may be called, exhibits characteristics of both the peach and the almond. It does not have the deep corrugations of the peach pit nor does it have the comparatively smooth shell with small pores of the almond. In this particular variety the kernel is mildly bitter. In almost every respect this cross exhibits characteristics of both the peach and the almond. In other cases this is not true, some approaching more nearly the almond type while others are almost indistinguishable from peaches. In other words, the variations are those naturally to be expected in hybrids.

Now to return to the almond again. We find that for best results in production the almond must be grown in a climate where the winters are comparatively short and yet where there is sufficient cold weather to force the trees into complete dormancy. Where the winters are long or the summers are so dry as to force the trees to come dormant too early in the fall there is a great tendency to premature blossoming in the spring. In other words, the first warm weather in the late winter will bring the trees into bloom because of the fact that they have completed their normal rest period. This same condition has been found to be true of certain varieties of peaches which can be grown in the South but do not do well when planted in the North. It is for this reason primarily, in our judgment, that almonds do not produce under eastern conditions. There are other factors, such as extreme humidity, which may have a bearing, and undoubtedly would in the maturing of these nuts, but this should not prevent them bearing provided they could escape the adverse weather of late winter and early spring.

A mistaken notion has been given considerable credence that the almond is much more tender to frost or cold than the peach. Our experience, where the two have been grown side by side under identical conditions, is that the almond will stand fully as much cold as

the peach and in some cases even more. The reason why almond crops are lost oftentimes when peach crops are not is due to their earlier blossoming and consequent subjection to the more severe weather of early spring which the peaches avoid.

It is evident, therefore, that the principal problem in producing almonds in regions of long winters, as compared with those localities where almonds can be produced, is to secure an almond which naturally has a long resting period, resulting in late blossoming, and yet one which will mature its fruit reasonably early. An almond tree beginning to blossom about the first of February will usually ripen its crop between the first and middle of August, though sometimes later. Those beginning to blossom about the first of March or later ripen their crops during September usually and often extend into October.

The question of soils and stocks is too broad to discuss here, except to dismiss it with the statement that the soils that will successfully produce peaches should also prove reasonably satisfactory for almonds through the use of peach rootstocks. These are commonly and successfully used in commercial almond orchards in the West.

Whether it will ever be possible to produce commercial almonds will depend upon whether an almond can be bred which will fulfill the requirements of late blossoming and early ripening and at the same time answer the requirements of a commercial nut. We should judge that it is possible, although we believe it is a big problem. Our reason for thinking so is that the Ridenhauer almond under eastern conditions will often produce nuts and it is recognized as doing quite well. We have never had an opportunity of tasting this nut but have seen photographs of the tree and have examined personally the nuts. Without any knowledge as to the actual ancestry of this nut we are very much inclined to the belief that it is a peach-almond. If this is so it opens up a line of breeding possibilities which should not be overlooked.

The procedure which should be followed will depend necessarily upon the conditions under which breeding experiments may be carried on. We believe that under eastern conditions the only opportunities for outdoor breeding work will lie along the line of interbreeding with peaches and almonds. The feasibility of indoor breeding with almonds is questionable in view of the difficulty of properly hardening for winter and yet affording protection during blossoming and providing at the same time for conditions which will favor the setting of the fruit. We do believe that there is abundant opportunity for experimentation, with the possibility that valuable results may be secured by systematic breeding along the line just mentioned.

Along with this cross breeding simple almond breeding experiments should be carried on, but these must be done in a locality where almonds can be brought to fruitage. Of course, the ideal

place for this would be in California in a known almond district, and it is hoped that as time goes on experiments along this line will be conducted in an effort to secure later blossoming varieties and earlier ripening varieties. Our guess is that it would not be possible, at least within the lifetime of one man, to lengthen the normal resting period of any strain of pure bred almonds to the point where they would be able to withstand the long eastern winters and at the same time shorten the ripening period to practical limits. The development of this work, as far as it can be practically carried, should result in relatively late blossoming almonds which could then be used as a basis for breeding with peaches in an effort to still further approach the desired results and yet maintain the desirable characteristics of the almond. This simply involves the application of known breeding methods to these fruits.

To accomplish anything of this kind involves the development of a long-time plan which must be consistently followed. We would not look for any results to speak of before ten years, and would not expect any definite worthwhile results short of twenty years. It appears, however, that the possibilities are great and well worth striving for, and it is our sincere hope that some day a variety may be developed which will prove adaptable to eastern conditions.

The usual summer climatic conditions which prevail in the eastern states are not favorable to the economical production of almonds in a commercial way but we see no reason why they should not be eventually developed to the point where they may prove of considerable value and satisfaction for home orchards. The very fact that thus far no varieties of peaches have been developed which are immune year after year to spring frosts would indicate that it would probably be impossible to secure an almond which would be better than any peaches now known. On the other hand, one never knows until he tries and we believe that out of the effort much good could be accomplished, not only in the possible production of satisfactory varieties of almonds, but possibly in the accidental development of new and highly desirable peach varieties.

The possible development of a desirable table or canning peach variety with a sweet kernel would in itself be well worth the effort.

I had occasion to examine those Illinois almonds on the table here. It is quite evident that even though dried out somewhat they have some of the characteristics of the peach. The hull itself is fleshy even though thin. That is a characteristic that does not appear in the normal, pure bred almond hull.

I was just talking with Dr. Morris about some efforts he made at Stamford, Connecticut, to grow almonds. He stated to me, what was a very great surprise, that almonds there are afflicted with peach leaf curl and other diseases to which, under our weather conditions, they are not subject at all. There are undoubtedly other conditions here, due to a different climate, which we of California do not recognize at all.

I have endeavored to make this paper just as short as I could. I think that after it comes out in the proceedings there may be opportunity to study a few of the suggestions made here, and I want to express, on the part of the people in California, our desire to cooperate with those of you from the other sections of the country in every way possible for the development of varieties of almonds, or peach almonds. I can see that it will be difficult to compete with the sections in which almonds are naturally produced under semi-arid conditions. But I do believe in being close to your market if it is possible and in developing an almond which will be worth while for local consumption, especially for home use.

The President: Dr. Taylor, we thank you for the good advice and suggestions offered in your paper. I believe some attempt has been made to study the almond here in this vicinity. I know of one instance down in Forest Lawn by Mr. Baker. I believe that some years ago Mr. Wile attempted to do something in a commercial way with the almond, but I have since learned it proved a failure.

As Mrs. Ellwanger was very gracious in giving up her place I am going to call upon her now to read her paper.

OPPORTUNITIES FOR A WOMAN IN NUT CULTURE

Mrs. W. D. Ellwanger, Rochester

When at Mr. McGlennon's request I agreed to give some of my experiences in nut growing at this meeting I had no idea such a large and comprehensive title was to be given to my brief remarks.

Are not such opportunities wide and open to all? Women are now taking up so many branches of agriculture, gardening, farming, landscaping, that specializing in nuts is but one more. A real love for growing things, perseverence in face of many discouragements, and incidentally a place to grow the trees, are all that is necessary. I hope before long there will be classes in nut culture in the women's horticultural schools.

What is more delightful than to plant a tree? Planting flowers is a pleasure of the present but a tree is a link with the future.

My interest in growing Persian Walnuts in this region was started in 1912 by reading in a newspaper that these nuts could be grown in any climate suitable for peaches. Then I remembered that when a child I had picked walnuts from a tree on our lawn here in Rochester. Having a farm on the shore of Lake Ontario, part of which was a peach orchard, it seemed worth while to experiment with walnuts. Needless to say I am still experimenting!

The first trees planted were about one hundred Pomeroy seedlings and some fifty grafted trees, of the Rush variety. Dynamite was used at this time with such success that we have used it ever since. The seedlings are now quite large trees but not over half a dozen of them have borne any nuts. I early learned from growers

in California that seedlings are a waste of time and money. I own a few acres of land in Southern California and of course have planted walnuts there. A few years ago I received word that the crop from my trees was being shipped to me. They arrived. There were six nuts. If I were a Californian I might say six bushels.

Three years ago the trees here bore quite a crop and no squirrel ever hoarded his winter supply with more satisfaction than I had with that first peck or so of nuts. Last year promised well, and many trees had nuts set for the first time, but owing to the intensely hot summer, or some other reason they did not mature.

There is a question as to the adaptability of Persian walnuts to this climate. The severe winter of 1917-18 with its sudden and extreme changes of temperature killed scores of my peach trees, while the established walnuts came through practically uninjured by a temperature of twenty-three below zero.

The World War did not take all the black walnuts in the country for gun stocks, for there are many fine trees still in the Genesee Valley. Every fall I am on the watch for trees bearing an abundance of large nuts which we use for parent stock.

It would be quite out of place for me to discuss the various methods of grafting before this audience all of whom know so much more about it than I do. But after many trials we have had the best results from grafting in the greenhouse. The black walnut stock is about four years old when potted, and the scions are cut in January or February and used immediately. Fifty per cent. is our average of success by this method, and some of the trees not two years old are bearing nuts.

I have tried planting pecan trees, but so far they have always been winter killed. Some Indiana trees planted this spring are growing and I am hoping they may prove hardy.

The Sober Paragon chestnuts have shown wonderful growth and bear nuts most abundantly. Each year, however, a tree or two is killed by the blight and I suppose soon my orchard will meet the fate of all the other chestnuts in the East. It seems as if someone ought to discover a remedy for this destructive pest. Tomorrow I hope to see you all at my farm where you can see what use one woman has made of her opportunities for nut culture.

The President: On behalf of the association I am certainly very grateful to you for your paper which contains some very valuable information.

Last week I went up to East avenue here to see the Thompson walnut grove and met Mr. Thompson and talked with him. The grove is in a very much run down condition. In fact he is thinking of using dynamite to blow it up and market the wood in Batavia for gunstocks at the gun factory there. He told us that in the thirty-six years that he has had it, he has had only three crops of nuts. One of the crops was an especially good one, I have forgotten the number of bushels he had, but he sold one hundred bushels, he said, to Sibley.

Lindsay & Curr at nine dollars a bushel. If he could get a crop every year at that price I think he would be making pretty good money. I would class that orchard as a failure.

Last week, however, I had the privilege of seeing a walnut orchard that certainly surprised me greatly. I went to Lockport at the invitation of our very enthusiastic member, Mr. Pomeroy, to see the Pomeroy orchard, and I saw several trees heavily loaded with good sized nuts. Mr. Pomeroy estimates that he will have in the neighborhood of six or seven thousand pounds of nuts. The trees look healthy and show no evidence of disease. As I understand some of the trees are fifty years of age and there have been only two crop failures in that time. My idea is that the Pomeroy walnut is very hardy and of unusually fine strain. I believe that there is little hope for the commercial development of the English walnut much north of the fortieth parallel. I believe there will be some instances found, like that of the Pomeroy nut, where the seedling will do very well. It certainly has done very well with him. The Avon orchards are seedling trees, of course, the nuts having been gotten from a residence on Lake avenue, Mrs. Cramer's, at the corner of Emerson street. Evidently that strain is entirely different from the strain of nuts represented by the Pomeroy orchard which were brought from Philadelphia by Mr. Pomeroy's father.

I am going to ask Dr. Morris if he will present his paper and make his demonstration at this time.

Dr. Robert T. Morris: I have had a good many experiences in grafting for a number of years. I have finally discarded most methods and have gotten down to rather simple principles. As a matter of fact this is the last word from my own point of view. During the past thirty or forty years I have changed my mind so many times on so many subjects that I have no confidence at all in anybody who puts any trust in me.

I am getting down to the splice graft. The reason why I didn't try it before was because it didn't seem reasonable to believe that the simple splice would hold. It was because I was so busy with many other responsibilities that on one occasion I neglected to brace some large splice grafts. Thus I learned that the splice graft would hold even through the very severe storms in our vicinity of Stamford, Connecticut. We have violent thunder storms and sometimes for a few minutes in advance of a storm we have a wind velocity of sixty or seventy miles an hour. If at the time the leaves happen to be wet the battering power of a seventy-mile wind is so tremendous that it will break out almost any form of graft. But my splice grafts during the past two years, simple splice grafts, subjected to this sort of storm, have not given way on a single occasion so far as I know, much to my surprise.

I will pass about some examples of the simple splice graft first and then show how we do it.

Here is a Stabler black walnut graft on common black walnut stock last year. For years I had been in the habit of cutting my scions and throwing the stubs away. I had a nice lot of hardy looking stubs in the grass and I said to myself "Why not try some of the stubs?" They made a very fine growth. I didn't lose one of them. Here is one of the big stub grafts and here is the growth it made last year. Here is another plain splice and the growth it made last year. This tree was killed by the ice in the river on my place last year. Sometimes in the spring we have great masses of ice come down that run through the orchard and kill some of my trees. That is the reason I cut off this one. I have only brought specimens that were injured but they show perfectly well. In this smaller splice you see I fitted the scion to the diameter of the stock. In the larger one I took no pains to do that. Furthermore the paraffin method was used. The scion is covered entirely with paraffin and I think you will notice, by rubbing your fingers over this stock, that the paraffin, although two years have elapsed, is all there. It is because I put it on in such a fine layer that it expanded with the growth of the scion.

Not always, but in order to make sure that my simple splice graft would hold, I have sometimes put in screws. I use flat-head, brass, wood screws, seven-eighths inch long.

I will put in some screws for you. So, if any of you fear that the simple splice grafts may not hold, put in screws and study Basil King's book on the "Conquest of Fear." This is a black walnut graft that I put in late this year with screws. You can see the screws projecting from the paraffin cover. I do not care if the screw sticks out quite a little distance. It is covered with a thin layer of paraffin. This graft caught and started to grow but was killed off by sprouts springing from the butternut in great masses before it had a chance to assert its own individuality. The graft, however, is all complete. Here is another one, where the screws are projecting, which was killed off by the stock sprouts below, with the repair all complete. In fact it would have gone on well enough to a successful growth if I hadn't been away and allowed the stock sprouts to grow. This shows, incidentally, the thin layer of paraffin. If we use a thick layer of paraffin it will crack and not be successful.

The simple splice graft is a very simple affair. In the first place it is well to have a knife with which you can shave. I think, Mr. Chairman, you could shave with that (handing knife to the President). That is the sort of edge to use in all our grafting work, the sort of edge that will bring terror to the heart of the mother of boys. I find very few people who really can sharpen a knife. I have been surprised at the small proportion of people who are really able to do it. They put on a feather edge, or they leave a round edge, or at any rate they are unable apparently to use the little finesse required to put the finishing touch on a really good knife. Above all other essentials is this little piece of carborundum made at Niagara Falls,

F F Fine. Moisten it, hold it in the fingers this way, and then by simply rubbing it back and forth in this way you can put on the very finest edge. Do not use a knife unless you can shave with it because it is quite essential to have the cambium layer very nicely kept.

A couple of years ago hearing of Mr. Biederman's work in the use of the plane for grafting with his Persian walnuts, it occurred to me to try it with shagbark hickories. I went out in the barn to look for a block plane and I found three or four rusty ones. I wondered where they came from and then it occurred to me that about eight years ago I had thought to try the plane, and did try the plane, but it was not a success. That was before we had any success in grafting hickories. Now we may use the plane almost to the exclusion of the knife in cutting our scions of hard wood trees. Perhaps the majority of scions are shaped with the plane rather than with the knife because it gives a much truer surface. The block plane, then, I believe, is to be used more and more instead of the knife because of the very true surface that we make on the scion and on the stock and very quickly.

Of course with a small scion of this sort that would be about the slope that I would use for my ordinary splice. Fasten the splice together and simply wrap it with raffia. There is an ordinary splice graft fastened with raffia. That is the simple form that has given me the best results and I have tried out all the fantastic forms of grafting.

Now I am going to use the plane on a little larger scion. That is about the slope that I would use ordinarily. We will say this is to be the scion and this the stock. In order to make them fit perfectly I will use a smaller block plane. Now I will pass this about. You see with what absolute perfection those surfaces fit. You can get absolute perfection of fit by trimming a scion with a plane instead of with a knife. Even the best experts, like Mr. Jones, who make beautiful free-hand cuts, will find that with a plane they may make still better ones. That is one of the grafts that I would ordinarily fasten just with raffia, but I will fasten one together with screws to show how it is done. Now we will say that this is the stock and this is the scion. I am going to prepare them to fit each other. Some will ask if I ever use a scion as large as that. Sometimes I use a scion two or three feet long and as large as that in diameter. They are full of vitality and make wonderful growth. In order to do this I trim it down roughly with the knife to the general shape before I use the plane. I will cut as true as possible with the knife in order to simplify my work later.

Mr. Weber: In a large scion don't you have to have a larger exposed surface?

Dr. Morris: I do not think that really counts.

Mr. Smedley: Isn't the tree in the ground when you graft it?

Dr. Morris: This is supposed to be in the ground.

Mr. Jones: You couldn't do a thousand of those a day?

DR. MORRIS: If you have something special, where you want to use up some big scions. But you can use the plane on little grafts just as well. Now this is the stock and Dr. Deming is going to represent Mother Earth.

MR. SMEDLEY: Are the scion and stock necessarily of the same diameter?

DR. MORRIS: Not necessarily, but preferably so. One's sense of nicety might demand that they be just alike, but you will find it doesn't make any difference. It takes a little longer to put in a big scion of his sort but it is very sure to grow. Your tree is already made by the time you have done this.

MR. SMEDLEY: Should you have bark contact all around?

DR. MORRIS: I could do it with contact on one side.

MR. CORSAN: What time of the year do you do it?

DR. MORRIS: Almost any time of the year, preferably May or June.

MR. CORSAN: Do you wax that before you put the raffia on?

DR. MORRIS: After everything is all complete that is my final touch.

MR. WEBER: When the stock is sappy wouldn't the sap jam the edges of the plane and roughen the bark?

DR. MORRIS: Not if you make it shave. I get the edge of my plane so it will shave. Then it will not roughen it. I can screw in a scion two feet long. I have tried it and had it start into growth. Thus I have got half my tree under way. Now I cover the whole thing with melted paraffin.

MR. CORSAN: How do you apply the paraffin, paint it on?

DR. MORRIS: Yes, with a soft brush.

MR. CORSAN: Do you use the stuff you buy at Woolworth's by the pound?

DR. MORRIS: Yes, I buy what they call parawax.

QUESTION: It is not necessary to wrap a scion with raffia if it is fastened with screws?

DR. MORRIS: No. After it is screwed you don't have to use raffia. I use either screws or raffia. In a large one like this the screw is preferable. In a smaller one the raffia would suffice. It is the plain splice graft that I use almost to the exclusion of anything else.

MR. WEBER: Wouldn't it assist the union, if the graft didn't make a perfect fit, to wrap it with raffia to hold it together?

DR. MORRIS: Possibly, but I think with the plane one can make a perfect fit. That is the idea at any rate. After three weeks of growth that will stand any storm.

QUESTION: How do you tell when the paraffin is the right temperature?

DR. MORRIS: That is very much as a woman does in cooking. You put in so much of everything. It is a matter of experience. I get it very hot but not hot enough to scald. The idea is to have it hot enough and to have it very thin. On one occasion my light went

out when I was grafting walnut trees. It went out when I was grafting the very last tree. I put in perhaps twenty or thirty grafts in all. All the other grafts caught but on that tree, after my light went out, only one caught. In examining into the philosophy of it a week later I found that the paraffin, being a little too thick, had cracked.

QUESTION: When is the best time to do the grafting?

DR. MORRIS: I think the best time is after the sap season in the spring; all through the latter part of May and in June and the first half of July.

QUESTION: Do you use paraffin of a particular melting point?

DR. MORRIS: I have tried many but the one I use the most is the commonest one. You can buy parawax in all groceries. If you wish to make the parawax harder for the southern sun put in stearic acid. It may be bought at any drugstore. Melt it with the paraffin and that will harden it very much.

QUESTION: What proportion do you use?

DR. MORRIS: It would depend on the degree of heat to be resisted. I suppose you might use it in the proportion of one to four of parawax, but very little stearic acid will harden it.

QUESTION: Isn't there a tendency to melt under the high temperature of the sun?

DR. MORRIS: As a matter of fact I pay no attention to that in the North. Although we have very hot days and the paraffin does soften, it does not seem to interfere with the repair on the part of the tree.

QUESTION: In the case of smaller grafts, what would be your objection to the use of the ordinary whip graft?

DR. MORRIS: It makes one more motion.

QUESTION: It seems to me that it is more quickly done?

DR. MORRIS: It may be; that is a matter of individual technic. My idea is to do the thing the quickest way. If a man has found that he can put on one graft more quickly, that he has a technic that gives him speed, which is one of the essentials of grafting, if you can put on the whip graft quicker than I can put the other on, do it.

QUESTION: Do you have any trouble with the oxidizing of the cambium?

DR. MORRIS: Yes and no. Of course you free a certain number of enzymes. I haven't thought of it as an oxidizing process so much as an enzymic injury, where enzymes are freed from an organic solution.

QUESTION: I think that is correct. That is the common method of expressing it.

DR. MORRIS: I use sometimes, when the weather is very hot and I am grafting in the midst of sunshine on a hot day, a solution that I have described containing salts belonging to the salts of trees. I use that to dip my graft in and in that way the enzymes that are freed from the cut surface are removed by the solution in such a

way that they do not interfere. Practically we can get almost one hundred per cent. of catches of our grafts now by the paraffin method, that is, with perfect scions, perfect stocks and perfect technic by the operator.

THE PRESIDENT: Time is pressing and we have with us a member whom I am very anxious to have you all hear. I refer to our beloved member and my warm personal friend, the Pecan King, Mr. J. M. Patterson of Putney, Georgia, who is here this evening with Mrs. Patterson and their two sons. It affords me great pleasure to introduce Mr. J. M. Patterson.

MR. PATTERSON: Ladies and Gentlemen, your distinguished president has set a nice pace for me, introducing me as a king! Of course I am not unmindful of the fact that crowned heads are not any longer in favor in this democratic world of ours.

THE PRESIDENT: When I introduced Mr. Patterson at the Chamber of Commerce yesterday to Secretary Woodward, I introduced him as the Pecan King. He is known as the Pecan King and he is the Pecan King. There is no question about it. Mr. Woodward responded in what I thought was a very gracious way. He said he was much happier in meeting a pecan king than he would be in meeting some of the kings in the old world.

MR. PATTERSON: That is my apology for being here. You have made it easy for me. I have been away from home for nearly five weeks traveling on four wheels, and I received notice from your worthy president just a day or two before leaving my office that he would expect me to read a paper on the Commercial Possibilities of Nuts. At all events I had no time to collect my thoughts or make any preparation, and those of you who have toured through a new country and through some twelve or fifteen states, and passed through eight or ten universities and got your graduation papers each time as you went through, will realize that I have had not much time to compose my thoughts on this subject.

However, I am exceedingly glad to be here and I am going to talk a little like a preacher I heard once in the city of Pittsburgh. He said, " My text will be found in the Gospel of John, 4th Chapter, 15th verse, which reads as follows:" and he read the text. Then he proceeded without a lapse of breath and said, " From which we now take our departure." My subject is the Commercial Possibilities of Nuts, "from which we now take our departure."

California, or the Pacific Coast, has found the commercial nuts, the almond and the walnut. The Southland has found the commercial nut in the pecan. You good people of the effete and frozen East are still looking for the commercial nut. That is how it comes that we are here. It looked to me very much this afternoon when we were out at Mr. McGlennon's nursery that he had helped you very materially to answer that question, that he had discovered for you one commercial nut.

We have in the South two pecan organizations, one of which we call the National Nut Growers' Association. You will notice the word *National* Nut Growers' Association. The association is composed wholly of pecan growers. Many of us recognize that the name is a misnomer. We have been hoping that the time would come when we could have the name of that organization changed to the Southern Pecan Growers' Association, but we have one old member who has one English walnut tree in his orchard, who says we are a national nut growers' association and he objects. Some time that English walnut tree will die or he will die, and then we will be able to change the name. Then we have the Georgia-Florida Pecan Growers' Association. There is a California Walnut Growers' Exchange and a California Almond Growers' Exchange, and I am hoping to see a time when this Northern Nut Growers' Association will have discovered some real commercial nut, and then we will have complete the organization of the nuts of this country, the Almond Association, the Walnut Association, the Pecan Association and then the filbert, or whatever nut you discover here. We will bring them all together in one great national organization, and we will have an organization of real nuts. I am expecting to see that day. (Applause.)

I read a criticism the other day of a book that was published in which the reviewer said: "It is well for a man when he sits down to write a book that he know something of the topic on which he is going to write." I know very little about the possible nuts that may become commercially important in this section of the world. If it wasn't for the fact that when I come North here I like to meet some fellow nut, we wouldn't care very much whether you fellows ever discover a commercial nut in this part of the world or not, because the Lord has been so generous to you. The Lord has not given us a perfect climate. He gives one climatic feature here and another one there and another one some place else. He distributes his benefactions. It seems to me he has been lavish with you people, especially in New York and all through the middle West and the East. You have so many things. Why should you want to grab off the nut business? But just for the sake of letting you have a little variety and having some real good things to eat, I am willing to have you discover some real good commercial nut and then the time will come when we will have this national organization.

I am going to tell you a little bit about the history of the pecan. I think you would be interested in that. The cultivated pecan is of comparatively recent history. It is not so long since those who were in the South dreaming of a commercial nut were in very much the same position as this association is here, although the South seemed to be the natural place for the pecan. There were no commercial pecan orchards twenty years ago. There were wild groves in the river bottoms of Texas which there are today, but there were practically no cultivated pecans. There were actually no bearing groves

of cultivated pecans. It is only a matter of fifteen or eighteen years that the cultivated pecan has been commercially planted.

I think our concern was among the earliest. I think we may claim to be the very first who, in a large way, planted pecans. We did not start with the intention of planting them in a large way. It was a sort of natural growth. It was only sixteen years ago this month, sixteen years ago, that I first heard of the paper shell pecan from John Craig of Cornell University; right under the shade of where we are meeting tonight I first heard of the paper shell pecan and was induced to put a little money in planting groves. I think I may say that New York State, through the instrumentality of old John Craig, can take credit for the start of the great commercial pecan groves of the South. Since that time pecan groves have been planted very extensively. I don't think that any accurate statistics are obtainable of the acreage planted to pecan groves in the district in which we are located in southwest Georgia, but in an area of probably forty or fifty miles I imagine there are seventy-five thousand acres of pecan groves. They have not all proven successful. Some have been planted on soil that was not adapted and there are some cases of insufficient or unwise care, and some of not having the proper stock to plant. For one reason or another a good many groves have not proven successful today. Others have proven quite successful. There is no quesion but what that which was a hope fifteen years ago is today a reality and that the cultivated pecan is today an established industry. I do not mean by that that we have reached the stage which our friend Mr. Taylor has reached with his almonds or which the almond growers have reached. We are still in our infancy and have many problems and the problems multiply as days and years go by. Fifteen years ago we would have said there were no insect pests nor any diseases of the pecan. They have certainly made themselves known in the last few years. We have a good many insect pests and we have some fungus. We do not believe that any of these will be beyond the skill of scientific investigation and that they will ultimately be brought into subjection.

As an indication of the growth of the industry, eight years ago the association of which I chance to be president gathered their first crop of nuts of something like six thousand pounds. Last year we harvested over four hundred thousand pounds of nuts. In eight years of course there was an increased acreage but they were all young groves. I tell you that fact just to show you that when you do find a nut that is adapted to your soil and to your climate, as the pecan is adapted to the climate and soil of the South, it will not take many years to develop such a nut into a commercial proposition.

I had the pleasure last fall of entertaining Mr. Pierce, the president of the California Almond Growers' Association. Mr. Pierce was very much interested in this young giant of the South in the nut world. He had had a very unfortunate experience in the

use of pecans. He had passed through Chicago a short time before and a friend of mine, an officer of our association, happened to be a friend of his, and gave him some pecans, and he liked them so well that as he started from Chicago on the way to Washington he indulged too freely, and by the time he got to Washington he had to go to the hospital for repairs. Mr. Pierce wrote me a letter after that and said that he didn't know why the Lord permitted trees to grow such nuts until he created a new race of human beings with gizzards in place of stomachs. That is because California men were not used to eating good, rich nuts. We claim for the pecan that it is about the best nut there is. We don't claim the earth but if you people can develop or discover any nut that is better in quality and more tasty and more alluring than the pecan, we shall be mighty glad to have you discover it, and we hope it will be adaptable to the South. You know the Buick automobile says, "When better cars are made, Buick will make them." "When better nuts are made, we will make them." We know that all pople can't have the best. We know that some people have to eat cheaper steaks. The trouble with this country today is that everybody wishes the very best. The packers tell us they have great trouble in disposing of the cheaper cuts of the meat. I do not imagine that the nut growers are going to have much trouble in disposing of the round steaks, but we are going to furnish the best nuts. The market for cultivated pecans has developed in a most marvelous way. There has never been any advertising, except in a very small way, and yet the demand has always exceeded the supply. It has grown just naturally. People learn of a good nut and they spread the good news to their friends so that the demand increases. Customers in New York but four or five years ago would order eight or ten barrels of nuts; they are ordering 150 barrels now.

I want to say to you, find a nut like that that you can grow in New York State or that you can grow down in Connecticut, or in any of this part of the world, and we will be mightly glad to see what you can do, and we will try to steal it and grow it in the South. It has been said that every great institution is only the shade of some great man. If you can build up a great institution of a great commercial nut here in the North let it be the shade of the Northern Nut Growers' Association.

I am not going to keep you longer because this rambling talk is not prepared. I have been interested as I drove through New England in seeing great groves along the public highways of maples and elms, and I have thought how wonderful it would be if those were all pecans or walnuts or almonds or some tree that would bear nuts instead of furnishing shade. There is a world of opportunity in this country for a commercial nut. They are used as delicacies now, most of these nuts, but they are food, and they are food of the very highest type. I expect to see the day when all our best hotels and restaurants will have on their menus nut steaks, almond and pecan

steaks, and when a great many of their guests will order these steaks in place of the beef steaks that they are ordering now.

I want to say that we are glad to have your distinguished president as a fellow pecan nut. He is largely interested in Georgia and we see his smiling face frequently in that section of the world. We are interested to see him succeed there and I am sure the members of this association are all interested and pleased to see what he has accomplished in developing the filbert right here in the shade of Rochester. (Applause.)

The President: Mr. Patterson, I thank you. I feel that I cannot let this opportunity pass to correct an impression that might have gotten over from one remark of Mr. Patterson's about the filbert nurseries being the result of my efforts. That is a long way from being so. In every successful operation I believe the master hand can be traced. In this operation of ours here the master hand has been that of my esteemed friend of long standing and very close coöperation covering a period of over a decade, Mr. Conrad Vollertsen. Mr. Vollertsen is entitled to the full credit for the success of our industry. I feel that I am justified in claiming for myself in connection with it the credit for the enterprise. Each of us in life has our particular place to fill. Mr. Vollertsen brought to me the idea of this filbert operation some years ago, over a decade, especially the idea of propagating the filbert from the layer instead of from the bud or graft, it being my belief up to that time that it could be propagated only by budding and grafting. He had worked in the nurseries in Germany as a young man and had told me of his experiences. So I sent to Germany and got five plants of twenty varieties, leaving to the nurseries from which I purchased them the selection of the varieties. I think the plants were six to twelve inches in size. From these, under the ability and knowledge of my friend, Conrad Vollertsen, has been developed what you saw this afternoon. I am mighty proud of it and so is he because he and I alone know what we have had to buck these last ten or eleven years. Speaking frankly, it has been pretty hard going sometimes, but personally I feel tonight, after what has been said to me by many of our members at our place this afternoon, especially the praise of our faculty to which I referred in my paper, that we have accomplished something really worth while, and it is my ambition and Mr. Vollertsen's, too, I know, to prove that we have a really worthwhile thing for the people. The pecan is the highest in food value of any nut known to the world today. The filbert is the second highest in food value and I believe it is a nut adapted for a wider range of soils and climates in the North than any other nut. I know this may sound a little like blowing my own horn, but I want you to understand that I am chuck full of filbert as well as pecan. I am certainly mighty happy for my pecan association in southwest Georgia, and I am feeling pretty happy tonight in connection with the filbert also.

I am met with a disappointment this evening. Mrs. Patterson tentatively promised to favour us with a paper on the use of nuts as foods. But I regret to say that she is somewhat indisposed and unable to favor us with a paper as promised. So I am going to ask another member, a new member, to make a few remarks on the subject of nuts as food. I know that he knows what he is talking about when it comes to a discussion of the subject of nuts as food, because I come in rather vigorous contact with him twice a week, and he talks nuts as food to me on those occasions. I am endeavoring to follow out his suggestions as closely as possible and I know that I am benefiting in health by so doing. I refer to James B. Rawnsley, the noted physical culturist who lives in this city. I have great pleasure in introducing to you Professor James B. Rawnsley.

Mr. Rawnsley: Mr. Chairman and ladies and gentlemen: The gentleman that Mr. Patterson referred to as going to the hospital for repairs was not taken there because of eating nuts. The cause of the need for repairs was good food going into that man's stomach and mixing up with a lot of refuse matter that he had been eating at some previous time.

Mr. Patterson: Almonds!

Mr. Rawnsley: I hope that there are no medical doctors in the place or any butchers because if there are I am liable to go through the door or window. The nuts that you people are growing I hope will be the only thing, along with fruits and vegetables, that will be eaten in the future. As Mr. Patterson said tonight, since God put nuts and fruits and vegetables on this earth, those are what we ought to use from the commencement of life. The nut is one of the cleanest and most wholesome foods that is grown. I have tried it a good many years and I want to tell you, ladies and gentlemen, that there is nothing so sweet, so good or so substantial. It does not take much of a meal of nuts mixed with fruits to keep a person alive and well and strong. The sooner you people that are growing nuts get that into your minds and use it the sooner you will find it the best advertisement by which to get new members into the association. Show it yourself by using them.

The President: I am mighty grateful to you for your words. We are going to try and get through one more paper this evening. It is by Mr. John Dunbar, Assistant Superintendent of Parks, Rochester, N. Y., on the subject, Nut Trees in Rochester Parks. I have great pleasure in introducing Mr. Dunbar.

Mr. Dunbar: Mr. President, and ladies and gentlemen: I picked up the program this morning and looking it over I was quite surprised to see that I was down there for a paper. We have given much attention for possibly twenty-five or thirty years to the establishment of an arboretum in the parks of Rochester of all the trees that are hardy in the north temperate zone. I think that perhaps the Rochester parks today stand next to the arboretum at Harvard

University in the number of species and variety of trees from all parts of the north temperate zone.

We are studying trees generally from the ornamental point of view and to educate the people in the value of trees. Of course we have a large number of nut trees, hickories, walnuts and hazels, and incidentally we are interested in their food value.

In listening to Mr. Rawnsley tonight I was much interested in what he said because he is a neighbor of mine and lives across the street. I remember seeing him on a cold winter day when I was walking down street in a big overcoat, five below zero. Across the street there was Mr. Rawnsley shoveling snow and all he had on was trousers and a shirt. I have found out tonight how he could do it, by eating nuts. I said to my wife that I didn't see how he could stand it but now I shall tell her that I have found out.

Of course there are some nuts that are commercially of no use here. The pecan is the nut of the South. Mr. McGlennon and Mr. Vollertsen are doing great things with the filbert here. I think there is a great future here in the North for the hazels and king nuts. Other nuts that are very important here because they are hardy are the black walnut and the butternut. If walnuts and hickories can be grafted in tens of thousands like apples and peaches, all right, go ahead, but in the meantime raise all the seedlings you can. I am surprised that so far nothing has been said here about the king nut. There are only two places in New York State where the king nut grows. It grows in the Genesee Valley from Rochester up to Mt. Morris quite abundantly and it grows around Albany and Central New York. There are no other places in New York State where it grows. It is a larger nut than the common shell bark. It makes a magnificent tree. I think the king nut should be planted. We are growing it ourselves in the park. The tree itself grows fifteen miles from here. We have it in the park today and I have planted a good many of these nuts. I think the big shell bark or king nut and the shell barks should be planted quite extensively. Put them in the ground and let them come up. They will come up. Another good tree we have here with great possibilities in it is the Japanese butternut. It is hardy and I understand it is growing at Lockport. These are a few rambling ideas. Incidentally we are doing all we can to spread the gospel of nut culture and the growing of nut trees. If people could see them in the parks it would help along their education.

MORNING SESSION, SEPTEMBER 8th, 1922

The Convention was called to order by the President at 9:30 o'clock A. M.

THE PRESIDENT: After a night of good rest we are ready to proceed with our deliberations and as we have a lot to do we are going to try to push things along fast this morning.

Some of the papers have not arrived and some of the speakers will not be here. Senator Penney of Michigan wrote me that he was not only in rather poor health but he was in the midst of an election primary and that it would be impossible for him to be here but that he would endeavor to send a paper. I am sorry to say that it has not arrived.

I was pretty sure that ex-President Linton would be here. But I have a telegram from him this morning saying it is absolutely impossible and that he, too, hasn't had any time to prepare a paper. Mr. Linton is a very busy man and about the only way to get a rise out of him is by wire. I have written him three times and wired him five times. Finally I succeeded in getting a telegram from him this morning. I was particularly anxious that he and Senator Penney be here to discuss the roadside planting of nut trees and the legislation of Michigan in that regard, believing that such aid would materially help us in getting other states interested along the same line. I'm sorry, therefore, that they are not here.

This telegram from Mr. Linton, received this morning, reads as follows:

"Expected until yesterday that I would get to Rochester convention but am bitterly disappointed in being unable to do so owing to fatal illness of chairman of our state commission, whose called meetings and pendent duties have fallen upon me. Senator Penney is in midst of strenuous primary campaign closing Monday and can not leave and Mr. Beck is in hospital recovering from operation. So your Saginaw trio, positively with you in spirit and good wishes, is held here this time absolutely and all regret the situation beyond measure. I expressed to you yesterday, prepaid, the Washington walnuts, fine young trees only eighteen months old, and will replace them next spring if necessary. Penney and Beck join me in sincerely desiring the success of your convention and extending kind regards to you and those present, all of whom we hope to meet another year.

WM. S. LINTON.

The trees we are going to plant tomorrow morning, if these seedlings get here, are grown from nuts furnished Mr. Linton by the superintendent of Mount Vernon. Last year we planted some in one of the parks at Lancaster.

I will ask Mr. Vollertsen to read his paper now.

Mr. Conrad Vollertsen: Ladies and gentlemen: My paper this morning will necessarily be very short as the subject assigned to me is one of which I so far have not had any practical experience and therefore am unable to say much about.

According to our program I have been assigned to make a few remarks on "The Blight-proof Propagated Filbert," a subject I think rather hard to discuss as we have so far no positive proof that blight, if it at all exists on the improved filbert, will not eventually appear on varieties we are now growing. I therefore believe the subject, "Blight-proof Propagated Filbert," should have been worded some what differently, as we have no assurance when blight may appear, nor any guarantee against its appearance. It may fall on our plants over night or at any time. That we can not prevent nor control.

In the nursery of improved European filberts which we have maintained for ten years, blight is so far not known and has never made its appearance. We know of other filbert plants, several varieties, all of German origin, in this, our home city, from thirty to forty years old, never affected by blight, bearing nuts today. But all this will not guarantee the improved propagated filbert to be blight-proof. We certainly do not claim our propagated improved filbert plants are blight-proof. In fact to our knowledge there is no such thing as blight-proof filberts no more than there are blight-proof pears, quinces or other fruits. But we do claim that our improved filbert varieties, imported from Germany, will stand our climatic changes very much better and will resist the attack of blight to a greater extent than any other variety imported from France or Italy.

We really do not fear blight. We have heard very much about it and have so far seen nothing of it. But should it eventually appear in our nursery I am fully convinced we can easily control it and prevent its spreading by cutting the affected parts thoroughly away, removing the diseased twigs or branches so low as to make the cut in entirely sound wood. Through such an operation I am fully convinced the disease can be completely eliminated in a comparatively short time, should it ever appear.

We have been repeatedly told blight will not only attack small parts or branches of the improved filberts but will kill them entirely. Such a thought I can never entertain, not for a moment. I have had too many years' practical experience with the growing and cultivating of improved hazel or filbert plants, and have never seen anything of the kind. It would be very interesting if members of this association who have observed blight on the improved hazels and seen plants actually killed by that disease would relate their experiences and the real facts so as to enlighten the public on the subject. For instance:

Where did it happen that blight killed the plants entirely?

What varieties were attacked and killed?

And was it genuine blight that killed them?

These questions should be well considered, particularly the last one, as it is a well-known fact that in a general way the term blight is frequently used for various injuries or diseases of plants causing the whole or parts to wither and die, whether occasioned by insects, fungi, or atmospheric influences.

We will, in the early summer, occasionally see on various shrubs or trees numerous little twigs and branches dead and decaying and the general saying then will most assuredly be, the shrub or tree is blighted, where a close and thorough investigation will not reveal the slightest sign of blight, merely injuries by frequent climatic changes in the late winter or early spring months.

I also have observed the same thing where insects were the cause of all the trouble. A little downy species of the aphis, or plant louse, had completely overrun a Stump apple tree and really caused it to die. The owner told me that tree was blighted. But here also no sign of blight could be detected. Nothing but insects caused the tree to die, not blight.

I merely mention these instances to show how thoroughly and readily a disease or ailment of a tree or shrub is called blight where in reality not the slightest sign of it can be discovered.

If our people had the understanding and would take the time to investigate the cause of their diseased trees I am fairly satisfied the complaining of trees or shrubs being killed by blight would not be heard as freely as it is today.

Now under no circumstances should this be construed as meaning that I dispute or doubt the existence of blight among our filbert plants. Not at all. Quite the contrary. We have, as stated above, so far no blight-proof filberts and no guarantee that blight will not eventually attack our plants. We therefore will have to be more or less on the alert, will have to watch our filbert plants as we do our pear or quince orchards or other fruit trees more or less inclined to blight. By no means let blight discourage the planting of filbert or hazel nuts, as I am fully convinced should it eventually appear it will not kill our plants. In fact it will not harm them as much as it will our pear trees, our quinces or other varieties of fruit inclined to that disease, of which we, in spite of blight, plant and maintain large orchards.

My advice would be to stop all talk on blight and wait until it appears. Do not let us cross the bridge before we come to it but let us watch our trees inclined to blight, particularly our hazel and filbert plants, as they are not blight-proof, but eventually should blight make its appearance let us be ready for it, fully prepared to receive it, not to welcome but to eliminate it. That we can do, that we can accomplish very thoroughly through the operation set forth in the beginning of this paper.

THE PRESIDENT: That is a subject that I feel we ought to have a little discussion on and I would like to hear from Mr. Jones.

Doctor Morris, Mr. Bixby, Doctor Deming, for a brief discussion on the points just touched on by Mr. Vollertsen.

THE SECRETARY: I have had very little experience with the blight. Two years ago Mr. Bixby and I visited the very large hazels in Bethel, Connecticut, seedlings raised from grocery store nuts, and we saw there the blight on some of the largest trees, on the large limbs, unquestionable blight with sunken areas covered with pustules. I didn't see the trees last year, but on Wednesday, just before taking the train to come here, I ran in to this place to get a bunch of hazels to bring here, and I saw the tree on which Mr. Bixby and I had found the blight looking as well as ever. In a hasty examination of the tree I saw one or two stubs where large limbs had been cut off. I presume that the owner had followed our advice and had cut off the blighted limb and, apparently, the tree itself was none the worse for the blight.

I have had hazels planted and neglected for twelve or thirteen years and this is the first year in which I have found the blight. I have found before other causes of death of parts of the shrubs, girdling by insects and apparent winter killing, but this year I found several of my trees on which were undoubted patches of cryptosporella. That is the extent of my experience with the blight.

MR. JONES: I have not had any actual experience with the blight but I have seen it in Connecticut. I have not found it on any of the wild hazels of Pennsylvania. Therefore we do not have it at Lancaster. I have not regarded it as nearly as serious as pear blight and some other blights that attack fruit trees.

THE PRESIDENT: What is that, Mr. Jones?

MR. JONES: I say I have not regarded the filbert blight as nearly as deadly as some of the blights that attack the fruit trees, because of the fact that it works very slowly, and it takes, I understand, about two years to girdle a limb of any size; therefore, it is easily cut out and controlled.

MR. CORSAN: Could it be that the blight would be very much more active in a tree growing in the shade than on one growing out in the strong sunlight and well nourished?

MR. VOLLERTSEN: I know of some trees that were for at least ten or eleven years practically overgrown by butternut trees. I have known the trees for more than thirty years. I visited the place about a week ago and found a tree doing fairly well under the circumstances. That tree is between thirty and forty years old and has grown steadily for the last five or six years entirely in the shade and is bearing fruit fairly well. There were quite a few nuts on it although there were more over the top than on the lower branches; but I did not notice any dead limbs or anything of that kind.

THE PRESIDENT: Do you refer to Doctor Mandel's plant?

MR. VOLLERTSEN: No.

Doctor Morris: Stamford is a natural home of the hazel. Wild hazels fill the fields to such an extent that they destroy pastures very often. Hazel blight, therefore, is to be found there as an indigenous organism or parasite. Among the native hazels it apparently attacks only those that have been injured or are weakened by age or otherwise. That is the common history where a plant has existed along with a parasite for centuries or ages, a certain amount of tolerance is established by the resistance of a few individual plants and the elimination of the others. By natural selection the best survives.

Now when I brought some European hazels to this place a little over twenty years ago they made a good start. In two or three years all were attacked with blight and at the end of four or five years all were dead. I spoke to Mr. Henry Hicks about it. He has a place on Long Island. Mr. Hicks said, "I have given up foreign hazels. They are no use. They all die. I don't try them." Whenever anybody says that to me it starts me right off doing it. When they said we couldn't graft hickories I said, "Well, here is something to do," and I did it. They said, "Well, we couldn't raise hazels; we might as well give up." I said, "Well, here is the best thing for us to do then." So again I got a small lot and observed them day by day. Very soon the blight began to attack them. I found it grew slowly and gave me plenty of time to cut it out. I neglected some purposely to see how long it would take the blight to girdle a limb and some of the larger limbs took two years. In all of the limbs that were affected, in the hazels which I wished to save, I simply cut out the blight with a sharp jackknife, painted the spot with a little paint, an antiseptic or something of the sort, and had complete control. In fact I found that I needed to go over my hazel bushes not more than once a year to look after the blight, and in one day, or part of a day, with a sharp jackknife I had absolute control of the blight.

There are some large European hazels that I have neglected and have allowed the blight to get under way. Some of them are so resistant that they bear very good crops notwithstanding the fact that they are neglected and have the blight. Others have died. Therefore it is a relative question, a question of relative immunity to the blight. My belief is that the blight will not be any more injurious to our hazels than the San Jose scale has been to the peaches. We have complete control of the San Jose scale because we know the habits of the scale insect. I believe we have complete control of the hazel blight because we know the habits of that particular sporella.

As to the question of growing in the shade or in the sunshine, on the Palmer property not very far from me, there are some very large bushes of red and white avellana and of the purple hazel that have been overshadowed by other trees because they haven't been looked after. Those are all very large bushes, in fact they have grown to be small trees and they are completely overshadowed by

other things. They have some blight but continue year after year to bear heavy crops of nuts.

The President: Mr. Bartlett, have you any remarks on the subject?

Mr. Bartlett: My experience has been very similar to that of Doctor Morris. I have visited possibly a hundred places and have seen hazels growing, some of which have probably been there seventy-five years. In talking with the people connected with the place I have often heard said, "Why, years ago we used to have hazels, a great many hazels here, picked maybe a bushel at a time, but the best varieties have died, and what we have left are worthless." Or perhaps, "There is only one bush left and we don't get any hazels now." Apparently the purple hazel is freer from blight than most of the other imported varieties. I have seen the blight in these places. I have seen branches from three to four inches in diameter that were attacked with blight and were still growing but were not fruiting very much. I know a very few places where hazels are grown within fifty miles of New York, and I know of some places where they are getting some nuts. But the general impression is that the European varieties will be attacked with blight and killed.

I have seen bushes that have been attacked by blight where the roots are alive but sending up very weak shoots. That is probably through neglect of stocks. Certain of those that I have raised, five or six years old, are absolutely free from blight. Most of the older trees that I have seen around have blight in some form or other.

Mr. Bixby: Doctor Morris' remark as to what Mr. Hicks says of giving up attempting to grow hazels because the blight would take them, seemed to me very appropriate in view of an observation I made on Mr. Hicks' place last fall. I found there a large hazel which was probably twenty-five feet high and bearing a fair crop of nuts. Mr. Hicks told me that he had brought that tree from Germany many years ago — I think it was over twenty years ago — and that that was the only one left out of a lot. Now if other European hazels had been killed there with the blight and this one was left there was apparently a blight-proof hazel in that lot.

I have seen a good many hazel bushes affected with blight, but I have not seen any since I went with Doctor Deming up to Bethel. I have seen no blight since then though I have looked for it whenever I have been where there were European hazels. I examined that tree in Mr. Hicks' nursery very carefully and found there was no evidence of blight. I feel as the other speakers do who have expressed themselves, that we have little to fear from the hazel blight; that if it does appear in the nurseries we can control it by cutting out the blighted portions.

Mr. Pierce: In northern Utah I have a number of bushes of the foreign and the American hazel and they are ten years old. So far I have not seen any evidence of blight.

I would like to ask a question. What form does this blight take, and is it deadly? In other words, will it kill the bush? Is it good to cut out the affected parts?

Doctor Morris: You find a depression of the bark over a small area, gradually increasing, and around the part that is depressed you will find a little swelling of the healthy part that is trying to grow over the blight area. This also contains the roots, if you can call them that, of the blight. You can recognize it everywhere on the hazel by the distinctly depressed area of bark, which should be cut out before it gets to be the size of a quarter.

In other cases the blight will encircle a small branch and cause a swelling instead of depression that looks very much like the swollen area around the depressed bark. There may be depression in the branch parts but the swelling blocks that so you can see only the swelling. These braches may be very easily removed, with as much ease as a boy would steal the nuts, so there is nothing to be feared on that score. If the blight is left uncared for it will kill some of the plants and it will not kill others. It will injure some also without killing them, so that we have to consider the question of what we call relative immunity. In the case quoted by Mr. Bixby we have a case of relative immunity of a hazel which has grown to be twenty-five feet high and bearing crops in the midst of the blight area on Long Island, while others have disappeared from the vicinity.

Mr. Bixby: I would say in connection with that hazel that Dr. Deming and I visited in Bethel that I took a blighted branch away with me and it was such an excellent example of a blighted area that I had a photograph made and it was printed in the Nut Journal.

The President: This discussion on the blight of the filbert is of intense interest to me. It is a considerable relief to us to hear these encouraging statements, because during our experiments, covering the past decade, the bugbear of all of our deliberations has been the possibility of blight wiping us out, it having been suggested at the time we imported plants that we would never get anywhere with them. I think we have little cause to feel very much worried on the subject of the blight.

It now gives me real pleasure to introduce to you our friend, Mr. Pomeroy.

Mr. Pomeroy: Mr. President, ladies and gentlemen: Josephus says that he has set down various things according to his opinion and if anybody holds to another opinion he will not object. That's my position in regard to nut growing. I will tell you a few things that I believe and if you hold another opinion you are entitled to keep it.

Professor John Craig once referred to a thing that surprised me very much. We Americans believe we are a very energetic, smart people not to be fooled much in a trade. Well, he had statistics which showed that after we have shipped millions of dollars worth of wheat and cotton and various other products to Europe we receive our pay in the form of great quantities of nuts which we

use for food, holiday nuts, all-year-round nuts. Now I believe that those nuts can be raised right here and we can pocket that money instead of leaving it in Europe.

I was a very small child when my father went to Philadelphia to visit the Exposition in 1876. While he was there he picked up a few walnuts which had dropped from a tree in front of his lodging house and brought them home and planted them. A very few years after he amazed us all by taking a load of nuts to Buffalo and obtaining more money for them than the hired man and I did for a large load of fruit.

At one time I put out some English walnuts in a cemetery as a memorial orchard and the trees are now doing fine. The other night my wife and I strolled over and looked at them and when we were on our way back we passed a neighbor's house where there were a number of maple trees on the lawn. I said to my wife, "Those maple trees are fifty years old, and there by the side of his lawn is a chestnut tree that is forty-four or five years old." She made the remark, "Those English walnut trees over there cast a much more beautiful shade than those maples," and it was true. I think Mr. McGlennon saw them.

THE PRESIDENT: Yes; that's so. I thank you very much, Mr. Pomeroy.

Mr. G. H. Corsan, of Toronto, Canada, is known as the "Canadian Johnny Appleseed." Mr. Corsan goes about the country and when he can find nuts and seeds of what he thinks are good trees and plants he gathers them up and arranges to distribute them. If Mr. Corsan will give us about ten or fifteen minutes I should certainly appreciate it very much.

MR. CORSAN: Mr. Chairman, ladies and gentlemen: Our friend here called me Johnny Appleseed, I suppose because I went around among my friends who had gardens and said, "Let me plant this," and I would plant a nut tree. I said, "Why don't you plant something with a utility value as well as a thing of beauty?" I said, "Why not plant something that will not only grow rapidly and cast a splendid shade but that will also return you something in the way of food?"

I first devoted twelve acres to the culture of nut trees. I afterwards added four more. I just planted seedlings. In the year 1912 I joined the Nut Growers' Association and I set out a hundred chestnut trees. When I found the blight was in them and I cut them all down but two. I have those two now and last year I gathered a peck of very large chestnuts from them which caused the Ontario government to take notice of what I was doing.

I bought a great many other trees, among them some of Mr. Pomeroy's. I had a hard fight with Pomeroy's trees. They would die down one year and grow a foot or a foot and a half the next and then die down again. But each year they increased a little in size and now they are over my head and are not dying down at all.

I tried a lot of others, among which were seedling English walnuts from St. Catherine's. They did not freeze down at all, but whether they will throw as good a nut as Mr. Pomeroy's I don't know. They are certainly a different nut.

Then I got a Chinese walnut of Black's nursery, Hightstown, New Jersey, and it is growing remarkably well. All three types of trees are doing very well and are all over my head, sometimes growing three or four feet a year, very rarely less than a yard from each terminal branch, and I have had no winter killing.

It may be interesting to recount a few other things about my place. I had an awful fight with mice. My land is in a valley and the spring floods come down and I can't plow the land or it would all be washed away. I put a tree in and protect it with a certain amount of space around it. I found that the mice would chew down the trees almost as fast as I could get them in, so I got some cats. The cats soon learned to prefer birds to mice so I killed the cats. Then I bought a flock of geese and the geese cropped the grass short and prevented it from growing so powerfully as to smother out the trees. But the geese had hard bills and when the trees were small they clipped off pieces of bark with their bills, so I traded the geese for wild geese. I learned that they are more discriminating in their choice of food and that though their wings are more powerful their bills are not as strong. They have kept the grass down for me and destroyed the homes of the mice. Then I got pheasants in order to rid myself of the insect pests. I feel that in another ten or twenty years we will have a very beautiful place.

I need not refer to the fact that nuts are very valuable for food. Dentists would all go out of business if we ate nuts.

Pennsylvania is a state which should certainly take up with its agricultural authorities the possibilities of nut growing because that is a state that can be ruined utterly by trying to grow grain on the hillsides. The water comes down and washes all the rich top soil off into the creeks and it is lost to us and our children.

The President: Will the secretary please read Doctor Kellogg's paper?

The Secretary: Mr. President, this is a very long paper and I have not read it over. It seems to me that perhaps we have devoted so much time to genealogy and reminiscences that the time is short for the papers which are to be read by members present. Would it not be well to defer the reading of this paper of Doctor Kellogg's to a later time, or, possibly, merely print it in the proceedings?

Doctor Morris: I move it be laid upon the table and printed in the proceedings.

The motion was duly seconded and carried.

(See Appendix for Dr. Kellogg's paper.)

The President: One of our important visitors is Professor James A. Neilson, Guelph, Canada. The title of Professor Neilson's paper is, " Nut Culture in Canada." This is an especially interesting subject to me.

Professor Neilson: Mr. President, ladies and gentlemen: I want to express my appreciation of your kind invitation to attend your convention and for the opportunity of talking to you for a while on the subject that is more interesting to me than any other branch of horticulture. I had looked forward to coming to this convention but wasn't just sure that I would be able to be here. Therefore when I got a wire from your president I immediately got busy and pulled the wires at the college and asked them to authorize me to come here at college expense. I am very glad to be here. It has been most interesting to me, and I am very pleased, indeed, to meet so many whom I knew already by reputation.

NUT CULTURE IN CANADA

J. A. Neilson, B. S. A.

Lecturer in Horticulture, Ontario Agricultural College
Guelph, Canada

The conservation and improvement of our native nut trees and the introduction of suitable species from foreign countries has not received much attention by horticulturists in Canada, except in British Columbia and in Ontario. In British Columbia, Persian walnuts, Japanese walnuts, filberts, almonds and European varieties of chestnuts have been planted to a limited extent in the fruit districts and small plantings have been made at the Dominion Experimental Farms located at Aggaziz on the mainland and at Sidney on Vancouver Island.

In Ontario very little had been done by the Provincial Experiment Stations to test the different varieties of nut trees until about one year ago when the Vineland Station undertook to establish experimental plantings. A few enthusiasts like G. H. Corsan of Toronto, Dr. Sager of Brantford, Dr. McWilliams of London and William Corcoran of Port Dalhousie are about the only parties who have attempted anything along the line of nut growing. These remarks of course do not apply to those people who have planted a few black walnuts or Japanese walnuts on the home grounds or along the roadsides. Of such plantings there are a few here and there in the older settled parts of the province.

For some years the writer has felt that something should be done by the Horticultural Department of the College to interest the people of Canada in planting more and better nut trees and in conserving the remnant of the many fine nut trees which formerly grew so abundantly in parts of Ontario and elsewhere. Therefore an

attempt was made during the spring of 1921 to interest the public in the possibilities of nut culture. A letter and questionnaire asking for information on nut trees were prepared and sent to officers of horticultural and agricultural societies, agricultural representatives, agricultural and horticultural magazines, daily and weekly newspapers, school inspectors and other interested parties.

The following is a copy of the letter and questionnaire which were sent out:

"Dear Sir:

"We are investigating the possibilities of nut culture in Ontario and would be pleased to have you assist us by reporting the occurrence and distribution of the various species of native and introduced nut trees growing in your locality. We are particularly anxious to learn of the exact location of superior trees and if any such are found we plan to have these propagated and distributed for test purposes. We would also like to secure the names of people who are interested in nut culture. Please fill out the enclosed questionnaire and return to the undersigned at your earliest convenience.

"Thanking you in anticipation of receiving some interesting information on nut trees, I am, yours sincerely, (signed) James A. Neilson, Lecturer in Horticulture."

Questionnaire:

Q. 1. Are any of the following kinds of trees growing in your locality:

American Black Walnut	European Chestnut
Japanese Walnut	Japanese Chestnut
English Walnut	Chinese Walnut
Butternut	Beechnut
Hickory nut	Hazel nut
Pecans	Filbert
Sweet Chestnut	

Q. 2. Do you know of any individual trees of the above mentioned kinds that are superior because of large size of nuts, excellent flavour of kernel, thin shells, rapid growth or high yields? Please give exact location of such trees.

Q. 3. Is any one in your section making a special effort to grow any native or foreign species of nuts? If so please give their name and address.

Name of correspondent .....
Post Office .....
Township .....
County .....
Province .....

I am delighted to say that I never did anything in my life that met with such hearty and general approval as this venture. From almost every quarter of Canada I received commendatory letters and offers of assistance. One encouraging feature was the keen interest shown by wealthy business and professional men in our larger centres and by some of our more progressive fruit growers and farmers. Inasmuch as my venture was an inovation there were of course some humorous comments to the effect that we had enough " nuts " in the country now without encouraging any more. I replied to my humorous friends that the " nuts " they had in mind did not grow on trees whereas the kind I had in mind did.

The information I received in answer to my questionnaire was very interesting and instructive and confirmed some of my impressions regarding the occurrence of nut trees in our province. More important still it showed that there were several superior trees of various species growing here and there throughout the country.

Geographical Distribution of Nut Trees in Canada

The chief native nut trees are the black walnut, the butternut or white walnut, the hickory, of which there are four species — the chestnut, the beechnut and the hazelnut. Of introduced nut trees there are the Persian, Japanese and Chinese walnuts, the European, Japanese and Chinese chestnuts, the pecan and the European filberts.

The Black Walnut *(Juglans nigra).*

The black walnut is one of our finest native nut trees and is found growing naturally along the north shore of Lake Erie and Lake Ontario and around Lake St. Clair. It has been planted in many other parts of Ontario and does well where protected from cold winds. The tree grows to a large size, sometimes attaining a height of 90 feet and a trunk diameter of 5 feet. When grown in the open it makes a beautiful symmetrical tree, having a large, rounded crown with drooping lower branches.

The black walnut is not found growing naturally outside of Ontario. It has been planted in Manitoba but does not do well there because of the cold winter. In 1917 the writer observed a few specimens near Portage la Prairie which were about five feet tall. These trees made a fair annual growth but most of this froze back each winter.

Many people in Canada believe that the black walnut is a slow grower. This impression is not correct as some trees grow very rapidly. About eighteen years ago I planted a number of nuts along the line fence and along the roadside on my father's farm near Simcoe, Ontario. Most of these nuts sprouted and grew and some have done exceptionally well. One of these trees is now thirty-seven feet tall and has a trunk circumference of forty-one inches at the ground. It has borne nuts since it was six years of age and this

year has a very heavy crop. Some of the first crop of nuts were planted and these in turn have developed into trees which have produced nuts. Nuts from the second generation have been planted and will likely make trees which will yield nuts in a few years. An interesting feature of the original planting is the great variation in the size, shape of nut, thickness of shell and yield. Some are large, some are small, some are round and others are pear-shaped. The majority of the trees yield well but a few, however, are light croppers.

The Butternut *(Juglans cinerea)*

The butternut is much hardier than the black walnut and has a much wider distribution in Canada. It occurs throughout New Brunswick, in Quebec, along the St. Lawrence basin and in Ontario from the shore of Lakes Erie and Ontario to the Georgian Bay and Ottawa River. It has been planted in Manitoba and does fairly well there when protected from cold winds. West of Portage la Prairie the writer observed a grove of seventy-seven trees. Some of these trees were about thirty-five feet tall with a trunk diameter of ten inches and had borne several crops of good nuts.

The butternut in Ontario sometimes attains a height of seventy feet and a trunk diameter of three feet.

The English or Persian Walnut *(Juglans regia)*.

The English walnut, or the Persian walnut, as it should be called, is found growing in the Niagara district and to a lesser extent in the Lake Erie counties. It is stated on good authority that there are about 100 of these trees growing in the fruit belt between Hamilton and Niagara Falls. There are several quite large trees in the vicinity of St. Catharines, which have borne good crops of nuts. One of these trees produced nuts of sufficient merit to be included in the list of desirable nuts prepared by C. A. Reed, Nut Culturist of the United States Department of Agriculture. This variety has been named the "Ontario" and is now being propagated, experimentally, in the United States. In the vicinity of St. Davids, on the farm of Mr. James Woodruff, there is a fine English walnut tree which produced ten bushels of shelled nuts in one season. This tree is one of the largest of its kind in Ontario, being about sixty feet tall with a trunk diameter of three feet at one foot above the ground and a spread of branches equal to its height.

The English walnut is not as hardy as the black walnut and is adapted only to those sections where the peach can be grown successfully. At present this tree cannot be recommended for any part of Ontario except the Niagara district and the Lake Erie counties and even in these areas it should not be planted unless it has been grafted or budded on the hardier black walnut.

Japanese Walnuts.

The Japanese Walnut is known to occur in Canada in three different forms — Juglans cordiformis; Juglans Sieboldiana; Juglans mandschurica.

Juglans Cordiformis.

This species is cultivated extensively in Japan and is the most valuable one for Ontario. The tree is very beautiful, comes into bearing early, bears heavily, grows rapidly and is reported to live to a great age. It is believed to be as hardy as the black walnut and ought to do well wherever the native walnut grows satisfactorily. In the best types the nuts are distinctly heart-shaped, have a thin shell, crack easily and contain a large kernel of good quality which can often be removed almost entire from the shell with a light tap from a hammer.

There are two fine heartnut trees growing near Aldershot which is near Hamilton on the road to Toronto. These trees are eight years of age and are about twenty-eight feet tall with a trunk diameter of eight to nine inches. In the seventh year one tree produced about a bushel of fine nuts with thin shells.

Juglans Sieboldiana.

This type was first introduced into the United States about 1860 by a Mr. Towerhouse in Shasta County, California. Since then it has been widely distributed and is now found in many parts of the United States and Canada. It is much the same in appearance as the one first described and grows just as rapidly and bears just as early but does not produce so valuable a nut. The nut has a smooth shell of medium thickness with a kernel of good quality. It does not usually crack easily and the kernel cannot be taken out entire, therefore, is not so desirable as the cordiformis type. In rapidity of growth the Japanese walnut is only excelled by the willows and poplars. In the vicinity of Grimsby there is a tree eight years of age which is about twenty-five feet high and has trunk diameter of seven inches at the base. It began to bear nuts in the third year and in the sixth year produced one bushel.

Juglans Mandschurica.

The general growth characteristics of this species are somewhat similar to the other two types but the nut, however, is quite different, being somewhat like a butternut. Because of this it is sometimes called the Japanese butternut. It is the least desirable of the Japanese group and should not be planted except where the cordiformis type will not grow.

Chinese Walnuts *(Juglans regia sinensis).*

The Chinese walnut is being grown experimentally in the northern part of the United States and has been tried at only one place

in Canada, e. g., in the grounds of G. H. Corsan, Islington, Ont. The tree is reported to be fairly hardy at the Arnold Arboretum, Jamaica Plains, Mass., and should be sufficiently hardy for southern Ontario. It is believed that the Chinese walnut will prove to be hardier than the English walnut and it may have an important place amongst the trees in the northern part of the United States and in Southern Canada. The nuts are quite large and have a shell which is thicker than the English walnut but not nearly as thick or hard as the native black walnut. The kernel generally has a fine flavour, being almost as good as the English walnut. Nuts of this species have been planted at the Ontario Agricultural College, Guelph, and at the Experiment Station, Vineland, Ont., and it is expected that trees will be hardy enough for our climate and produce nuts which will be as good as the Persian walnut.

The Sweet Chestnut *(Castanea dentata)*

The sweet chestnut is found growing naturally on sandy ridges in that part of Ontario extending from Toronto to Sarnia and southward to Lake Erie. At the Central Experimental Farm, Ottawa, there is a fair sized tree and near Newcastle there are a few fine specimens.

It grows to a large size, sometimes reaching a height of one hundred feet and a diameter of five feet at the base. When grown in the open it forms several heavy branches and makes a broad rounded crown, but when grown in a dense stand it makes a tall, straight tree.

The native chestnut is subject to a fatal disease called chestnut bark disease. This disease is not known to occur in Ontario, but there is no assurance that it will not appear and, therefore, the planting of this tree is attended with some risk.

A dwarf type of chestnut has been reported from east of Ottawa in the Ottawa valley. The tree is about fifteen feet tall and produces a small burr containing only one nut. I have not seen this tree so cannot vouch for the accuracy of the above statement.

Exotic Species of Chestnuts.

Inasmuch as very few of the Chinese, Japanese and European chestnuts have been planted in Ontario very little can be said regarding their behaviour. Dr. Sargeant reports the Chinese chestnut (Castanea Mollissima) as being hardy at the Arnold Arboretum and therefore it should be adapted to southern Ontario. The Japanese chestnut is also quite hardy but is susceptible to chestnut bark disease. A few Japanese chestnut trees are growing near Fonthill, Ontario, and have borne some good crops. The tree is a small, spreading grower, comes into bearing fairly early and bears quite heavily.

The Hickories.

There are four species of Hickory native to Canada. The shagbark, the bitternut, the pignut and mockernut.

The shagbark hickory (Carya ovata) is the chief one of value for the production of edible nuts. It is confined to the St. Lawrence valley from Montreal westward and along Lakes Erie and Ontario for a distance of 40-50 miles back from the shore. It reaches a height of fifty to ninety feet and a trunk diameter of one to three feet and grows best on deep, fertile loams.

Bitternut Hickory *(Carya cordiformis)*

This species has a wider range than the shellbark and is found in southwestern Quebec and throughout Ontario from the Quebec border to the Georgian Bay district. It grows best on low wet soils near streams but is also found on higher well-drained sorts. There are two fair sized trees on such a soil on the O. A. C. campus. This species may prove to be of value as a stock for grafting with the shellbark kingnut and some of the good hybrid hickories.

The mockernut (Carya alba) and the pignut (Carya glabra) occur along the north shore of Lake Erie and along Lake St. Clair.

The mockernut is not of much value as a nut tree but the wood is considered to be superior to other species of hickory.

The pignut is generally a small tree which produces nuts of variable size, form and flavor. The kernel may be bitter or it may be sweet and the nuts vary from round to pear-shape.

The Hazels.

There are two species of hazels native to Canada — the common hazel (Corylus Americana) and the beaked hazel (Corylus cornuta). The hazels have a wider range than other nut-bearing plants in Canada, being found in almost every province from Nova Scotia westward to British Columbia and as far north as Edmonton in Alberta and Prince Alberta in Saskatchewan. In Ontario the beaked hazel grows as far north as Hudson Bay and in many other parts the common hazel grows very abundantly and bears heavily. In Norfolk County it is very common and in places almost covers the roadside in the little traveled sections. Dr. N. E. Hansen of Brookings, South Dakota, has made a few selections of the common hazelnut found in Manitoba and is now propagating the best of these for distribution.

A few filberts have been planted in Ontario but have not done very well. The growth of wood has been good but little or no nuts have been produced. In Guelph there is a filbert about fifteen feet tall growing on the grounds of J. W. Bell, but like most other filberts in this province it has not yielded nuts.

The Beech *(Fagus grandiflora)*

This tree grows in the hardwood region from Nova Scotia westward to the western end of Lake Superior.

On suitable soils it attains a height of eighty or ninety feet and a diameter of four feet. The nuts are much appreciated by old and young, but on account of the slow rate of growth and the irregularity of bearing very little has been done to plant this tree.

THE ALMOND *(Prunus amygdalus).*

Almonds have been tried to a limited extent in the warmer parts of Canada but only with indifferent success except on Vancouver Island. It is possible that a satisfactory strain will eventually be found that will extend the range of this desirable nut-bearing tree.

Introduction of New Species

In addition to the efforts to gather data regarding nut trees I decided to introduce some good exotic species for trial with the hope that some of these might prove hardy enough for our climatic conditions. I thought that northeastern Asia would be the most promising region from which to obtain nuts for planting. Therefore, I wrote to the Mission Boards of the Methodist, Presbyterian and Anglican Churches and obtained the names of their missionaries in those fields. I then wrote to several of these missionaries and outlined my programme and asked them to send me samples of the best nuts growing in their respective sections. Here again I received great encouragement and assistance. Several packages of fine chestnuts and walnuts were received from China and Japan. Some of these nuts were planted at the College and the remainder were distributed throughout the province to interested parties. Owing to the length of the period between the gathering of the nuts and their arrival at Guelph many had lost their germinating power, consequently I only succeeded in getting ten walnuts to grow and failed entirely with the chestnuts. However, we may succeed in germinating a few more walnuts after a winter's frost.

I am aware that we might not get as good nuts from these plantings as the parents were, but it is also possible to get a real good tree which would be hardy enough for our climatic conditions. Should we succeed in this endeavor it would be a desirable acquisition and a great improvement on our native black walnut.

Improvement of Native Trees

Attempts were made to improve ordinary black walnut trees by grafting. Scions of the Persian walnut and the Japanese walnut were obtained and grafted onto some of the seedling black walnuts planted by myself years ago. I regret to state that in this phase of the work I was greatly disappointed. Not one scion grew but the stock trees grew amazingly after being cut back and would have been fine for budding this summer if I had been able to get the buds at the proper time.

Educational Work

An attempt has been made to bring before all our students at the O. A. C. the advantages of paying more attention to nut culture. These lectures have always been well received and almost invariably have aroused special interest in the minds of those who are horticulturally inclined.

Addresses on nut culture have been given to Kiwanis Clubs and Horticultural Societies and articles have been written for the agricultural and horticultural press.

A small bulletin is being written and it is hoped that it will be available for distribution in a short time.

Plans for the Future

The activities outlined above will be continued on a larger scale and in a more thorough manner, provided I can get the necessary funds to carry on the work. The search for superior trees and bushes will be continued and nuts from good trees in China and Japan will be introduced in much greater quantities for test purposes. The conversion of poor or ordinary native nut trees into superior trees by grafting will receive special attention.

In this way, ladies and gentlemen, I hope to attain the ideal of all true horticulturists, e. g., " To make our country more beautiful and fruitful and thereby help to serve the æsthetic and physical needs of our people."

Doctor Morris: Mr. Chairman: Canada is the next country in which great developments in all of the branches of science will occur. It is to develop, of course, in our present cultural period and I hope this movement for the development of nut culture in Canada will keep pace with the other developments.

I want to speak about one point of Mr. Corsan's. Game breeding can go very well with nut raising. Wild geese will graze like sheep, they will keep the grass and weeds down, and after they are ten days old they need no feeding at all until winter comes. They will graze like sheep, live out of doors like sheep, take the place of sheep, and will return to the land immediately valuable fertilization.

The pheasants Mr. Corsan spoke about are tremendous destroyers of insects. I have had pheasants in my garden this year and the other morning I looked out of the window and saw a pheasant in the midst of a nest of fall web worms. The pheasants will destroy insects of every sort. The only difficulty is that where there are rosebugs in abundance they will kill young pheasants.

I hope every one will take a copy of this " Game Breeder " that Mr. Corsan has left on the table. The subscription price is very small and we may profitably add game breeding of certain kinds to our nut breeding with benefit all around.

Mr. Bixby: Mr. President: There are some points brought out upon which I could throw some light. I have some specimens of

Juglans mandschurica which were sent by E. H. Wilson from Korea. I also have a young tree growing that is apparently larger leafed and with thicker shoots than even Juglans cordiformis. The nut is rougher than the other.

I had the privilege of talking to Doctor Wilson regarding his travels in Japan, particularly in relation to the Japanese walnuts. He tells me that Juglans sieboldiana is a wild tree he has found all through the Japanese islands, from the southern part of the northern island Yezo to the mountains of Kyushu, the southern island. He says that Juglans cordiformis is a cultivated tree found in only three or four provinces in central Japan where the walnuts are cultivated. He also tells me he has never seen any of the so-called Japanese butternut type with the rough shell.

I devoted some time three or four years ago to finding out what this so-called Japanese butternut really was. I could never find any instance of where Japanese walnuts, either cordiformis or sieboldiana, had been imported from Japan and planted here and trees grown from them, where those trees had borne rough-shelled nuts like butternuts. In every case where I found any trees bearing those so-called Japanese butternuts they were grown from nuts, Japanese walnuts, which had been grown in this country. In a number of instances I was able to find that the nuts which were planted were smooth-shelled nuts, either sieboldiana or cordiformis. When they were planted and the trees grew they bore these rough shelled Japan nuts. In a number of instances I was able to find native butternut trees not far away.

The other question was about the varieties of the American hazel. We have here specimens of the best variety which we have found, the Rush hazel. The gentleman who asked about it may see specimens on the table. I believe that will be commercially valuable.

THE PRESIDENT: I think you have all enjoyed Professor Neilson's address quite as much as I have. I wonder, Professor, if it would be agreeable to you that we, as an association, should communicate with these people who answered your questionnaire, inviting them to membership in this association.

PROFESSOR NEILSON: Mr. President, I think that would be an excellent suggestion, and I would be very glad indeed to prepare a list of those that I know are interested in nut growing, and also give you a list of the names of people who gave me exceptionally good replies.

THE PRESIDENT: That's fine. That's perfectly fine.

PROFESSOR NEILSON: Yesterday when you were talking about a membership campaign it occurred to me that it might be well for me to write personally to several people whom I know are interested in nut growing, asking them to join.

As a matter of fact there is one gentleman in southwestern Ontario who suggested to me that we form a Canadian branch of the Northern Nut Growers' Association.

THE PRESIDENT: Don't do it. Just let us all be one.

PROFESSOR NEILSON: I think that's the better way to do it.

THE PRESIDENT: Thank you very much. Is Mr. John Watson here?

MR. OLCOTT: He asked me to state in his behalf that he really didn't have much to say, he noticed your program was pretty well filled up, and he asked to be excused. I hoped Mr. Watson would say something here, but what would be more important would be for him to speak before the nurserymen and induce them to take more interest in our work. Mr. Jones is here and Mr. Watson was here. Of all the nurserymen in this nursery center here that is the only representation.

Nursery catalogues list seedling trees for the most part. One nurseryman wrote me the other day saying he was continually receiving requests for nut trees but he couldn't supply them and knew nothing about them. He asked me for a list of nurseries growing them. Nursery nut trees are not being produced in very great quantities except by Mr. Jones, and they are unlisted in the nursery catalogues, or only listed in an incidental way, very much as though they were tacking on something in the way of citrus fruit, or something of that kind.

A subject that this association might well take up in the enlisting of the nurserymen's interest in this work. Mr. Brown, by the way, of Queens, New York, was here last night. There was a third one here, the head of a very large nursery down there. I talked with him. He was here with Mr. Dunbar. He was interested mildly but not from a practical point of view. I don't know what is the reason for this lack of interest. I thought maybe Mr. Watson could tell us.

THE PRESIDENT: This thought occurs to me in connection with Mr. Olcott's remarks, that it might be desirable for us to send a representative from this association to the annual meeting of the national nurserymen, and let such representative put before the nurserymen the possibilities of making the growing of nut trees in their nurseries a real feature.

MR. SPENCER: Mr. President, several years ago when I first became interested in nut raising I wrote to the University of Illinois which has really one of the great agricultural schools. It is especially famed for its soil fertility studies and for engineering. I asked them what they were doing in the way of spreading information in regard to nut trees, and if they could give me a list of persons from whom I could purchase reliable stock. To my amusement they said they had no list of nurserymen who produced nut trees. I wrote back to them and said that it seemed to me that in a country which is a nut country they ought to know the products of their own

state, and I sent them a list of the people from whom they could get trees.

Now I think it would be good policy to send information to the various agriculture schools, giving them what we know of their particular territory based on our experiences, and also send this information to the farm bureaus.

THE PRESIDENT: Mr. Olcott, what do you think about the suggestion to send a delegate to the nurserymen's convention. You are familiar with the nursery trade.

MR. OLCOTT: That's a good suggestion, Mr. President. I don't know — I had thought of Mr. Jones, who is in the nursery business. It might mean competition for him but I didn't think he would be able to supply all the trees that might be needed. Mr. Jones, by the way, is a regular attendant at the nurserymen's association.

THE PRESIDENT: He would be the man of all men to carry the message and I am sure that he would be very glad to.

MR. CORSAN: Mr. Chairman, I have an idea that the best thing we can do is carry on a magazine campaign this winter. Now my wife is a very good magazine writer and can fix up anything in good shape. Send me along all the photographs you can to the Brooklyn Central Y. M. C. A., where I will be located this winter, and on cold, wet days and odd days I don't work, why, we can get up some magazine articles on nut growing.

THE PRESIDENT: It affords me great pleasure to introduce Mr. Bixby.

THE EXPERIMENTAL NUT ORCHARD

WILLARD G. BIXBY, Baldwin, N. Y.

We have heard much about the desirability of the experimental nut orchard and the association has repeatedly urged the planting of such by each one of the agricultural experiment stations in the country. These have been advocated in order that we might learn of the behavior of the fine varieties of nuts that we now have under varying conditions of soil and climate, and in this way accumulate the experience out of which to make positive recommendations as to the species and varieties that might be planted in any given section with reasonably assured prospects of success.

The association has been criticised, sometimes a little harshly I have thought, for the lack of specific planting recommendations, for, as a general rule, that was what those interested have wanted. They did not want to be experimenters; they wanted to plant varieties and get reliable estimates of the returns that might be expected and information as to the returns that similar plantings have shown. Indeed the statement has been made that, unless the association could give this, it could not hold its members and would largely fail in its mission.

That it has not until recently made any very specific recommendations of this character is to my mind an evidence of wisdom. There is a legend told of King Canute whose courtiers flattered him by telling of his power, not differentiating between the immense power he did possess from that which he did not, and who persuaded him to try it on the rising tide. The King learned a lesson by the test that he never forgot. Had the association attempted to make very definite recommendations before it could point to specific instances where things had been done it would almost certainly have failed as signally as did King Canute.

It is not because it did not realize the value that such recommendations would have, but because it did realize that the experience necessary had not been accumulated before it could safely make them. It is only through experience that recommendations worth while can be made, and it is because of the need of accumulating this for the various sections that the association has advocated the planting of experimental orchards.

It is encouraging to note that while these are not being planted as rapidly as we would wish, the work is going on steadily and we are continually learning of new plantings. Some of the older orchards are now giving us their experience. The oldest plantings are those of Mr. John G. Rush, West Willow, Pa., consisting largely of Persian walnuts, and of Mr. E. A. Riehl, Alton, Ill., consisting of chestnuts and black walnuts.

Mr. Rush's orchard has given us an American hazel, the Rush, the best native variety that we have and which seemingly has commercial value. It has also shown us that the nuts on a young grafted hickory tree, a Weiker, are considerably larger and crack easier than the nuts from the parent tree, and that the English walnut will grow and bear when grafted on practically every species of walnut, black walnut, butternut, and Japan walnut, and it seems likely that this orchard will be a source of knowledge for us for many years to come.

A number of others have been started some of which are beginning to give us evidence of value. Probably more problems have been solved, particularly those relating to propagation on Dr. Morris's and Mr. Jones's than any others so far. Dr. Deming is giving us evidence on grafted hickories of a large number of varieties and Mr. Littlepage's and Mr. Wilkinson's orchards are giving us evidence on pecans. There are also a number of others still too young to give us much information. Mr. Riehl's orchard of chestnuts and black walnuts has gotten beyond the experimental stage and is now a commercial success.

I had a desire to establish an experimental orchard when living in Brooklyn, before I owned any land on which to plant trees, and I bought and set out trees on the land of three relatives before it was possible to set any on my own land. The principal thing gained from these early plantings was experience and the principal things learned

were things not to do, for none of the trees then planted are alive today. Buying my present place in Baldwin, at the close of 1916 gave me about three acres available land and since then I have been gathering grafted, budded or otherwise asexually propagated trees of all the fine varieties that we have. At present there are on my place some

14	varieties	of	black walnuts
2	"	"	butternuts
12	"	"	Persian walnuts
4	"	"	Japan walnuts
14	"	"	chestnuts
20	"	"	pecans
25	"	"	hickories
23	"	"	hazels
4	"	"	almonds

The only nut tree, native in the northeastern United States of which I have no named variety is the Beech.

In addition there are seedling trees of four additional species of walnuts, seedlings from several hybrid walnut and hickory trees, besides some thousands of seedling nut trees of practically all species for use as stocks.

I have for the past two years been gathering selected native hazels from the various sections of the United States taking care to select bushes that bore nuts that were relatively large, thin shelled and fine flavored.

Inasmuch as the hazel is native all over the country, and just how to get bushes that bear the best nuts is not generally known, I will tell how I do it, hoping that many others will seek out the best hazels in their section and get them into cultivation. I provide myself with a cloth about as large as a large handkerchief, a number of wooden labels, some paper bags, a hand vise, a pair of calipers, a scale and tools for digging plants. A spade or round-nose shovel is about the best tool for digging the plant and frequently a hatchet, axe, mattock, or bar is required in addition in case the hazels have to be dug away from among the roots of large trees or from among stones of considerable size.

When a plant is found where the nuts look promising the branch on which nuts are to be examined is marked temporarily by throwing the cloth over it. A nut is then carefully cracked in the hand vise, taking pains to extract the kernel whole. This is then calipered with the calipers, set at a minimum size desired. If it is undersize the bush is rejected and another sought. In measuring the longest dimension is the one considered. The minimum size depends on the section from which the hazels are being taken, no kernel which is less than 3/8" in its longest dimensions being considered. While sometimes it requires a good deal of hunting to accomplish it, I have never had to take bushes where the kernel was smaller than this and it is seldom that it is necessary to take those

where the kernel is as small as this. In many instances it is very much larger. If the size is satisfactory the kernel is then eaten, only those bushes having well flavored kernels being taken. If all tests are satisfactory the cloth is removed and a wooden label put on the bush which is then dug. The nuts are removed from the bush and put in a paper bag labeled the same as the bush; the bush is cut back to about 6″ in height and then put in a sack or other convenient means for keeping moist till it can be put into the ground.

The gathering of the above mentioned trees in a small compass and closely observing them have enabled me to make a number of observations which may be of interest.

Fertility of Soil: The importance of this was shown strikingly in the case of a lot of Japan walnuts received in the spring of 1918. They were quite large and seemingly never had been transplanted and were dug with small roots. For lack of a better place they were set in sod ground which had not been cultivated or fertilized for many years. They eked out a miserable existence during the years 1918 and 1919. During the spring of 1920, I put chickens in that patch and an improvement was noted that year but this year practically every tree has grown six feet or more. The manure of the chickens and the thorough cultivation of the soil caused by their scratching have certainly worked wonders. While I do not minimize the effect of clean cultivation, I am inclined to believe that abundant plant food is the really important thing, for a goose watering pan under a tree pushes the tree along at a remarkable rate, and geese never scratch. They do keep the grass closely cropped, supply an abundance of manure, and the watering pan puts the plant food where the trees can get it.

Pruning: The importance of severely cutting back was strikingly shown this spring. A butternut raised from a nut in a lot of "Virginia" butternuts, bought in a nut store and which had outgrown every other tree in that lot and which I believe to be a Japan walnut butternut hybrid was transplanted this spring. Care was taken to get as much of the roots as possible and practically all were obtained; good soil was taken to fill in around the roots. Over the half of the branches were removed but the five highest ones were not shortened. This tree has not grown as well this year as some others not as vigorous and set in poorer soil but where all branches were cut back severely. Were this the first time I had noticed this, I might have considered it an isolated case, but the need of severe pruning was emphasized even in this case where I hardly expected it to show on account of the tremendous natural vigor of the tree which was transplanted, and the ideal conditions under which the transplanting was done.

Varieties: I get frequent requests from persons who want to know the best variety of this nut or that nut with the idea of plant-

ing only the best. The thought behind the request is one with which I heartily sympathize, but the method of accomplishing it that the enquirer has in mind will not accomplish it. The failure of most plantings of European hazels has, it has been thought, been due more to lack of proper pollination than to any other one reason. This year several varieties showed abundant pistillate flowers but there was but one European variety where it was not evident that the staminate flowers had suffered greater or less winter injury. This variety, Grosse Kugelnuss, shed an abundance of pollen when pistillate flowers of several of the others were receptive and there are nuts on three or four varieties for the first time. I believe that the success of Messrs. McGlennon and Vollertsen in fruiting the European hazels would have been but a fraction of what it has been had they not set out the large number of varieties that they did. In setting out nut trees at the present time as large a number of varieties as practicable should be planted. Later we will have the accurate observations that will enable us to select a few and feel sure of getting good crops of nuts, but we cannot do this now.

Chestnuts: While the blight is all around me and several of my trees have been killed by it, there are enough left to produce nuts of nearly every variety and I see no reason yet to change my belief that, by watching, cutting out blight and occasionally setting out new trees, chestnuts of nearly every variety can be grown and fruited in the blight area.

Age of Bearing: My experience would seem to show that grafted or budded nut trees are as a class not slow in coming into bearing provided they have had good care. I have had Lancaster heart nut trees set out in the fall bear next spring and have had hand-pollinated English walnuts bear the third year. Apparently a year or two longer will be required before they bear staminate flowers. Walnut trees certainly appear to bear fully as young as apple trees, in fact sooner, as a class, than apple trees which I set out at the same time that I did walnut trees. Pecan trees appear to take about two or three years longer than walnuts and hickories several years longer than pecans. On the other hand top-worked hickory trees bear about as soon as young transplanted Persian walnuts. Hazels with me have taken about as long as Persian walnuts but I think that they are more rapid in most instances. The soil of most of my place is quite heavy, walnuts, pecans and hickories doing finely. I am inclined to believe that a lighter soil would be fully as good if not better for hazels.

Stocks: The varying rapidity of growth of trees of the same variety has been noticeable and has caused more than passing notice for one can not help thinking that such varying rapidity of growth would be likely to cause equal variations in bearing. It would seem as if this must be caused by the variations in the stocks for the

scions all come from the same tree. Inspection of seedling trees has shown that some grow much faster than others. If normal growth trees are considered, trees making less than half this are numerous and those making double are rather rare. Apparently we have in seedling stocks enough variations in vigor of growth to account for the variations in growth noticed in grafted trees of the same variety. Mr. Jones tells me that he expects to discard nearly 50% of his seedlings because not vigorous enough to bud or graft. Then there are some trees which seem incapable of taking grafts or buds. It would seem very desirable to select rapid growing stocks that will take buds and grafts readily and use those but this will mean working out means of propagating them by cuttings, layers, or some asexual method and these have not been well worked for nut trees, other than hazels, although some work has been done on it.

The above conclusions are largely from the limited observations I have made on my small place. None are very new for I believe I have heard all of them advanced before, but observing them myself has fixed them in my mind in a way that they could not have been otherwise. Many of them have been corroborated by others. For example, Mr. Jones has shown me walnut trees of the same size set out at the same time, some severely pruned and others not, where the severely pruned ones in two or three years had so far outstripped the others as to make it very noticeable and it seemed as if the difference in vigor would continue. On the other hand it is possible that there may be points where the experience of others differs from mine.

THE PRESIDENT: There is one more address this morning. That is by Doctor Morris, the subject being, "Pioneer Experience and Outlook."

DOCTOR MORRIS: Mr. Chairman, ladies and gentlemen:

Lord Byron said that the reason why he did not commit suicide was because he was so curious to know what was going to happen next. For any one to do pioneer work in almost any department of human activity there are two essentials: First, he must be more or less stupid and not read the handwriting on the wall; and in the second place he must be very obstinate and persistent. Given those qualities one may succeed in pioneer work in almost any department of life.

Something over twenty years ago I had the idea of putting upon my country place every kind of American tree that could be grown there. I planned to occupy a little time away from professional work and attend to this. As I began to acquire information the subject grew so rapidly that I found it would be necessary to give up my profession wholly and employ several assistants in order to carry out this idea. Consequently I cut down my ambition to include only coniferous and nut trees. This study in turn grew so rapidly that I found it necessary to cut out everything except nut trees, and then I found that one might devote his entire life to

the subject of hickories alone to the exclusion of all other occupation.

In the beginning of the development of my nut trees there were failures continually and it became interesting. Lord Byron found it interesting to live in order to see what was going to happen next. My failures were so interesting that I was very curious to know what was going to happen next. I started in with a very large lot of shagbark hickory trees. I had them grafted for me in the South. I think I expended something like $250 for that lot. I had it grafted upon the common hickory stock of the South. They lived through the winter, the summer, and the next winter, but in the spring, following a few warm days and a freeze, the bark of every one of those common stocks exploded, fairly, and the entire lot was lost, not one tree lived.

A great many trees that I brought from farther south, from California and from the Pacific coast, all died. I learned then that the climate there will allow trees from western Europe to grow because they have the Japanese current furnishing similar conditions of climate; that trees from that part of the country would be mostly failures here in the East; and that trees for the East should come from northeast Asia where climatic conditions are similar.

I learned also that trees from a distance, not accustomed to our soil and climate, would not adapt themselves readily, and it would require long selection and breeding to acclimatize or adapt to our soil trees which were developed under differing conditions. Out of a large lot of things that I got from Chili, hoping that their altitude would correspond to our latitude, nothing grew. Consequently by elimination of things that would not live I gradually arrived at the conclusion that it is best for any locality to develop the species, or a like kind of tree, which belong to that locality. Well, they say, how about the prairies that are treeless? Of course we have there to deal with a question of fire that from time immemorial has swept the prairies covered with grass and has been halted only when it reached the regions of established forests; so that on the prairies I have no doubt we may have great groves of nut trees flourishing. In my locality the trees that are indigenous are the ones which do the best, and that is the line for perseverance.

Then I took up hybridization. I found there were many disappointments. It was difficult to be sure of securing reliable pollen and of getting it to the flowers at the right time and surely, so that we would have good hybrids instead of parthenogens which sometimes develop as the result of the female not making fusion with its mate.

On one occasion I remember I covered a lot of branches with large bags for pollenization, and going out a few days later to add pollen I found a wren's nest with two eggs in one of my bags. Now if a wren could lay two eggs in one of those bags the cross-pollenization was not likely to be a success. In this work, however, I find that

we have a tremendous field opened up and one which might yield particularly to the ladies. It is very pretty work, it is nice work. It includes idealism, speculation, the idea of developing new trees, or trees that one has never seen before. After many failures in hybridizing I find now that by following rules it is simplified very much. Almost any one who is persistent enough may learn eventually to hybridize very easily.

The question of labeling trees and of keeping track of different specimens was one that gave me many disappointments. I would lose the labels, lose the records, so I was not able to tell truthfully about trees when visitors came to ask me about them. I know in one lot where I had a lot of hybrid trees, each one marked with a stake and number, the cow of a neighbor got over the fence into the field and the boy who came after that refractory cow found that to pull up those stakes gave him very convenient objects for throwing at the cow, and my labels were all hybridized.

This sort of thing was the kind of disappointments that I had in early experiences in growing nut trees. It is very essential, however, to keep good records and I find now that the best way is to use a galvanized iron rod with a metallic tag stamped with a machine and fastened on in such a way that it will not be injured by any sort of use. These galvanized rods, galvanized spring wire, are very durable if one is careful about placing them on the trees. That experience in keeping the labels was one which was very disappointing at first, but the question has now been finally settled.

The number of animals and birds that like a good thing is perfectly surprising, and in trying to raise my seedling nuts I have had great difficulty and have had to take up a new department of natural history in order to study the habits of rodents and of the birds. The crows have been, perhaps, the worst enemy, after the field mice, of the seedling nuts that were planted out in the field. But the crows may be kept away if we put up bean poles with a simple cotton string stretched between them at a distance of twenty-five or thirty feet. One of my friends who took my advice said that it didn't work, that he had not only put up the string but had fastened a piece of tin onto the string. That is just where he made a failure. The crows sized up the situation immediately. They sat on the fence and looked it over and made up their minds that those things were not meant for them, and then they went in and destroyed his grain. But a simple string between the poles will keep the crows guessing, and that alone will suffice to keep them out of the grain, nuts, or anything else.

These are a few rambling remarks which come to my mind, but still they belong to the experiences that we have in getting things under way in our experimental work. As to the outlook, there is no doubt whatsoever but that any man who is interested in the subject, who loves trees and loves plants, can manage all the problems. We shall eventually have horticulturists and amateur gardeners who will

raise all of this great new food supply without difficulty.

We must now look for new food supplies. Wheat, grain, corn, and the other cereals are not going to supply this country indefinitely but the nut trees will. It is absolutely impossible to have over-population. It can't be done. Over-population as a social matter relates wholly to the habits acquired by people in using established kinds of food, but with the development of the nut trees, which furnish the appropriate starch, oils, and essentials of human diet, the danger of over-population becomes absolutely nil. We can not have over-population anyway, because nations of people reach cultural limitation, just as breeds of cattle run out, just as a breed of dogs runs out, just as a breed of any cultivated animal runs out. We are sure to do that. In all of our cultural periods we are sure to rise to a certain point, decline, and go out, and somebody else will follow, so that we never can really have over-population excepting as a matter of choice rather than one of necessity. On the question of food supply we may avert over-population by taking up something new to meet the conditions. That new thing right now is the development of the nut trees which furnish all of the food essentials and will take away any fear whatsoever of any over-crowding of the people of this country.

EVENING SESSION, SEPTEMBER 8th, 1922

The convention was called to order by the President at 8:30 o'clock P. M.

Mr. Spencer: Mr. President: I have an idea I would like to present on behalf of the ladies. Quite a number of years ago I was entertained at dinner on the plantation of Mr. John Todd, St. Mary's Parish, Louisiana. It is on the banks of a stream lined with live oaks at a point where Evangeline and the Arcadians passed on that trip to the next county which is known as Arcadia. The whole country round there is full of reminders of the Arcadians.

Mr. John Todd has several thousand acres in his plantation and four thousand acres are in sugar cane. When it came to the dessert a beautiful two-storied white cake was placed on the table. After eating it I turned to Mrs. Todd and said, "I dislike very much to comment on a lady's cooking but I hope you will excuse me if I ask you what this cake is made of. There is something peculiar about it that I do not recognize." "Well," she said, "while you and the other gentlemen were down inspecting the land that you came to see, I had the boys go out and rattle down some pecans. They cracked them, picked out the meats, and I put them in the oven and dried them. I knew that they would not dry out ordinarily in time for my meal. I then ran them through the meat chopper and chopped them as fine as I could and then I put them through a very fine sieve. The parts that were fine enough to go through I put in the flour of the cake, the rest I put in the filler between the two

layers of cake and in the frosting." It was one of the most delicious cakes I ever tasted in my life. With that recipe you can make a white cake in about three minutes, fill your flour and your frosting with pecans and you certainly will have a feast for the gods.

Doctor Morris: Mr. President, the committee on resolutions has referred matters to the secretary for action.

The Secretary: It was the duty of the committee on resolutions to prepare the resolutions on the deaths of Doctor Van Fleet and Colonel Sober, copies of which are to be sent to their families. The committee not having had time to meet that task has been assigned to the secretary, who will be very glad to carry it out to the best of his ability.

The other and more important task of that committee was to take action on the suggestions made by the president in his paper in regard to increasing the membership of the association. As it has been impossible to take such action in the committee I propose that we now take up consideration of that matter as a committee of the whole.

I would like at least to say that Mr. Jones has offered to the association five hundred nut trees to be given as premiums with new memberships. I think Mr. Jones said that they included Stabler walnut trees, Chinese walnuts, and what others, Mr. Jones?

Mr. Jones: Chinese English walnuts, or Chinese Persian walnuts, Mayette & Franquette English walnuts and Stabler black walnut seedlings. I have an idea the Chinese walnuts would be the most attractive.

The Secretary: They would all be seedling trees, of course?

Mr. Jones: Yes; they would all be seedling trees. We would put them up and mail them out.

The Secretary: Think of what an extraordinary, generous offer that is on the part of Mr. Jones, to contract to send out five hundred nut trees to as many new members, dig and pack and send them out!

Mr. Jones: Well, growing the trees doesn't cost very much. Of course packing the single trees will cost more than the trees but we are glad to do that if it will help out.

The Secretary: I know that to some members this premium offering for new members does not seem an advisable thing; to others it does seem a good thing to do. Perhaps that would be a good question to debate at the present time.

The President: I think it is a good idea, Doctor, to the end of getting a thousand members this year?

Mr. Jones: Set aside a thousand trees if you get a thousand members.

Mr. Olcott: Mr. President, Mr. Jones said the cost of growing the tree isn't so much, but the packing and mailing is something. How would it do to offer the tree at cost of packing and mailing —

fifty cents, or so? I suppose the value of that tree would be about a dollar, grown, packed and delivered. Suppose we made it twenty-five, thirty-five or fifty cents, something to cover the cost of packing? Would that not make it ——

MR. JONES: (Interrupting.) We don't want anything for packing.

MR. O'CONNOR: Mr. President, If you make a bonus of that kind, which is very generous of Mr. Jones, I think it would be appreciated by some, but others would say, "Well, a thing which you get for nothing isn't worth much." This gentleman behind me here says, "Make it cost a little something, which would make it more attractive." How about putting the membership up a little, so as to cover the cost of mailing.

MR. JONES: I would say that the association was giving these trees because it wants them tried out for new varieties.

MR. SNYDER: The fact that our association offers these trees ought to be enough to establish their value. A new member would appreciate receiving something in this way. The largest horticultural society in our country is the Minnesota Horticultural Society. They have followed the practice for years of giving to each new member a tree of some kind, scions or plants of new fruits, and it has been a great success in building up their society. I doubt not that it will be here.

MR. SPENCER: I'm heart and soul in favor of the movement for better nut trees. I'm tired of having trees planted that produce nothing but litter, and for the small boy to keep breaking all the time instead of going fishing. As I said the other day through the committee on trees of the Bird and Tree Club of Decatur we have placed in that city a hundred and fourteen nut trees. I believe that I can go to the different purchasers and say that this association is anxious to increase the knowledge of the people as to the value of nut orchards and nut trees for food and shade and I can get them to become members. When those subscriptions are sent in send the names to Mr. Jones and have all the trees put in a little package and sent to me. Then I can deliver them and Mr. Jones will only have one package to do up.

I believe by a little effort among our friends a great deal of good can be accomplished. For instance I stated here that I was going to buy a subscription to the American Nut Journal and send it to the Maitland County Farm Bureau. Likewise, I hope I can get the Board of Education or the Public Library, which purchased twenty-eight different trees to put in the library grounds, to subscribe for the Nut Journal and take out membership. It won't be very hard, I should say, to get fifty or sixty new members in Decatur without going out and making myself a regular canvassing agent. I have got a great many friends there and I know that upon my representation they would be very glad to take out a membership and get a tree. Anybody can go and plant a Carolina poplar or a soft

maple, or a basswood, or an elm, but his lot won't look different from any other. If all the ladies in town dressed in the same calico and the same cut you would not know whose wife was who. This idea of having all the yards, all the lots, all the places look alike, is wrong. You might as well have your home look distinctive and if you will take that idea, to have your place stand out as a place distinct in horticulture on your street, in your block, or in your city, you can appeal to civic pride. You must appeal to something besides dollars and cents. You must appeal to their public spirit, their civic pride. Then you can get them interested. A great many people are proud of their city and there are a great many people who can very easily say with Paul, " I am a citizen of no mean city."

Keep at it and take advantage of this offer of Mr. Jones. I believe by following those lines you can very easily go out and get five or ten members apiece.

Mr. Bixby: I don't want to throw cold water on any idea that is going to increase the membership but it seems to me that there are some objections to the proposed plan. In the first place the association has gone on record as favoring largely the planting of grafted trees. Now on the proposed plan the minute we get a new member in we have to send him a seedling tree. That does not seen to me the best thing to do. In the second place, I have had a good many years' experience in merchandising and it has always worked out with me that people do not much appreciate what they get for nothing. You can do this if a man is going to buy a certain kind of goods, by offering him an inducement, giving him something for nothing you can make him buy more than he would otherwise; but if a man who has never had a certain kind of goods, generally speaking you can't sell them to him by offering him a prize with them.

In the case suggested by Mr. Spencer, where a member working in a certain location could club with others and get several new members, why that hasn't the same objection. I do think that it would be a fine thing if the members in the different sections each agreed to get five or ten members, go after them and get them. I think that would be fine. And if they are willing to be responsible at the end of the year if they don't get them and pay two dollars apiece for the ones they don't get, why that would help out the treasury.

Mr. Smith: Mr. Chairman, I am rather in favor of the premium plan. In this great state of New York there exists an organization at Geneva known as the New York State Fruit Testing Cooperative Association. In order to get members they offer premiums, a yearly premium. The year that I joined the association they sent me a new apple which had been tried out and found to be a very desirable fruit. They named it the " Tioga " variety. The next year they sent me as a premium twelve new raspberries that had been tested first by the Geneva Experiment Station, a branch of the agricultural college, and then by this association of fruit growers.

Now I don't know how it would operate with others but it was an inducement to me in the first place to get that new apple to experiment with, and the next year it was an inducement to get the twelve new raspberry bushes which are claimed to be the best raspberries grown.

The objection raised by Mr. Bixby seems to be, however, quite a valid one. The organization has put itself on record as opposed to seedling nut trees and it is a question whether we ought to encourage the distribution of seedlings. But in some way or other I'm in favor of the premium plan to attract new memberships.

THE PRESIDENT: Is it not better to plant seedlings than none at all? It is possible that some of the seedlings might be really worth while. Those that are not really worth while can be top worked.

MR. JONES: Mr. President, my idea about the Chinese walnuts and the Stabler walnuts was that if we want to get new varieties we have to get them from seedlings. My plan was to grow these and send them out as extras to people who had sent in orders for other trees. I thought that in that way we could introduce them to those who would take an interest in them. It would take a good deal of land and a good deal of money and a good deal of attention to care for several hundred or several thousand such trees, but you could send them out in that way one at a time and possibly get new varieties superior to anything we have. That was my idea in disposing of these trees. I thought that if the association felt that that would be an inducement for new members we could send them out in that way as premiums. The only difference in the cost to me would be the packing.

MR. SMITH: Would it be possible for the association to take out from this first year's dues sufficient to compensate Mr. Jones for the difference between the value of a seedling and some of the best nut trees, so we could say to a proposed member, "We are giving you something that years of experience have proved to be the very best thing up to date, and we want you to plant this and care for it"? I think he would be more interested if he knew he were getting a tested tree than if he were getting a seedling. The seedling may be a good thing and it may not.

MR. WEBER: Mr. President, we know that in the spring the dry goods stores distribute shade trees, and people carry them all day with the tops tied up and the roots uncovered. You might as well expect a fish to live out of water as to expect those trees to live. If we send the average person a tree he may make it grow but the chances are he will not, so why let him ruin a good grafted tree with his initial experiments in planting a nut tree. On the other hand you will emphasize the distinction between seedlings and grafted trees, because on his coming into the association you will present him with a seedling and explain to him in advance just the purpose for which it is being given. He will then plant that tree. If it grows he can see its performance along side of a later

grafted tree which he will buy if he is interested in furthering his nut tree plantings. If he isn't, why, you get his membership fee and he centers his membership around that seedling which he thinks is the finest thing in the world.

Last summer I was talking nut trees to the wife of a rather prominent Detroit man. They have traveled around the world considerably. We were discussing some nut trees which had been sent out. I knew the size of the trees and I didn't laugh, or I sort of saved my face, when she asked me the question, "How many bushels of nuts could we get next year?" I just closed my jaws a while and looked out of the window. I didn't want to dampen her enthusiasm.

THE PRESIDENT: Mr. Tobin, I would like to have your views on the subject.

MR. TOBIN: This offer of Mr. Jones's is of great importance to this association. I have been interested in trees and forestry and plants of all kinds but until the present time I have not been so much interested in the cultivation of nuts. I wish to say that if there is any way I can help this association along in regard to an experimental station or in any way whatsoever, financially or otherwise, if the suggestion could be made I would be glad to hear it.

THE SECRETARY: Mr. President, this association is not opposed to the planting of seedling trees. One of our founders, the late John Craig, advocated the planting of seedling trees in great numbers, for only thus can we originate new varieties. The association is opposed to the dissemination of seedling trees as grafted trees. It does not advocate the planting of seedling trees for commercial purposes or for ordinary home use. It does not advise the purchase of seedling trees for growing nuts. In sending out these premium trees we should send with them a letter distinctly stating that the association does not advise the planting of seedling trees from a commercial point of view, but it does wish to disseminate these seedling trees which we offer as premiums for new members, for the purpose of testing and the possible discovery of new varieties of nuts. It would then be clearly understood. Certainly such seedling trees shouldn't be sent out to give members the idea that we advocate the planting of seedling trees for any other purpose than of possibly obtaining valuable new varieties.

MR. O'CONNOR: Mr. President, I'm a life member of the Wisconsin Horticultural Society which has offered a thousand dollars for an apple better than the Wealthy. We also offer premiums for new members every year. Sometimes it is a seedling apple tree. Among those premium trees may be a seedling which will win the prize. We do not know what the seedling nut tree will do. We may get something from a seedling which is far better than anything we have to-day on the table before us. Nature is something wonderful and no one can tell you what she will do. Only this last year has what is called the "O'Connor" come out. But

we find this O'Connor nut is not hardy enough for certain sections of the country. This Persian walnut before you is a seedling, too you know, from nature.

So it is through seedlings that we are going to get better fruit. I believe that Mr. Jones's offer is a very good thing. But I suggest that we send these seedlings out with the understanding that they are seedlings and that we don't know what they will produce. If the new member will plant them and take care of them (and we should give a little instruction as to how they should be planted) in a few years, seven or eight if it is a pecan, he should see it coming into fruit.

I would like to say that if you will dynamite the hole with a one-half stick of twenty per cent. dynamite, or, if you are afraid to use the dynamite, dig a large hole so as to give these young roots a chance to spread, a grafted tree will come into bearing in three years. I have seen them do it down there with us in Maryland and I believe they will do the same thing anywhere else.

THE PRESIDENT: I would like to hear from Mr. Vollertsen on the subject.

MR. VOLLERTSEN: I haven't a great deal of confidence in seedlings. As a general thing we find all the nut trees are inclined to go back to their original type. If we take our filberts, even the best varieties, the chances are that they will go back to the European type that they originally came from. I have proven it time and again on the farm down there. I don't think it wise for this association to send out seedlings.

THE SECRETARY: Mr. President, in order to bring this question to a head, I move that Mr. Jones's offer be accepted and put in to practice if a suitable plan can be devised and carried out in the estimation of the executive committee.

Seconded and carried.

MR. OLCOTT: Mr. President, I wonder if the suggestion of Mr. O'Connor is clearly appreciated. It was barely suggested in his talk but he did not seem to clinch it at the end. As I understand his idea it was that this plan of furnishing a tree as a premium might well be accompanied by an offer of a prize for results, which would be an added inducement to membership.

THE SECRETARY: I will see that that point is considered by the executive committee.

I wish also to say that Mr. McGlennon, if I understand him aright, has offered to get one hundred members in the ensuing year if the others present will get ten each.

THE PRESIDENT: That's right, Doctor.

THE SECRETARY: I don't know just which comes first, whether Mr. McGlennon is to get one hundred members and then the rest of us to get ten each; or whether we are to get ten each and then Mr. McGlennon is to get the others!

THE PRESIDENT: Well, Mr. Secretary, I have associated with me the champion membership getter. When we can go out and get twenty or twenty-five in a month I think we can go out and get the others. We are all enthusiastic now and happy. We are glad we are here and we are going to do wonders this next year. But I'll wager inside of a week our ardour has materially cooled and it will be getting colder until about a month before the next convention. We are not going to get anywhere that way. We want to get busy immediately after this convention, and if we do there is no reason why we can't have a thousand members by the time of the 1923 convention. I repeat that my office will have a hundred members by the time of the next convention but it is with the understanding that the rest of you co-operate in this movement and that each of you here, and the other members who are not here, be informed and instructed what is expected of them, to get at least ten each.

MR. BIXBY: I don't believe you will ever succeed, Mr. President, in getting each of the other members to get ten members each. If the rest of the members get a hundred between them they would be doing more than we ever did before.

THE PRESIDENT: Yes, Mr. Bixby, but even if the members here get ten each I think if we follow them up closely and keep right after them we can increase this membership to a thousand.

MR. BIXBY: I will agree for one to get ten or else pay the amount in to the treasury.

MR. JONES: We can get ten.

MR. WEBER: Mr. President, I will get ten or kick in to the treasury the money they would have brought.

THE PRESIDENT: That's fine. That's thirty right there. How about you, Mr. Thorpe?

MR. THORPE: I think I can get it.

PROFESSOR NEILSON: I think I can get ten.

THE PRESIDENT: I think there is no doubt about it. Mr. Spencer will get ten won't you, Mr. Spencer?

MR. SPENCER: I will try to.

THE PRESIDENT: Well, you will, won't you, or else you will "kick in" with the money,—$20?

MR. SPENCER: Yes, I think so. Well, if I am going to put in $20 I want to say something more on the subject. If we send out this Chinese tree it would be very easy to put in a slip stating that the association is very anxious to know whether this is suitable for the receiver's particular part of the country. We should tell him that we don't know whether it will grow in Illinois or in Louisiana, and that it's an experiment on the part of the association to learn whether this tree, which is desirable in China, is suitable for his particular locality. We should ask him to please take care of it, watch results and report to the association. Make him sort of a partner in the discovery.

THE PRESIDENT: Pat, you will get ten, won't you?

MR. O'CONNOR: I will promise myself ten.

THE PRESIDENT: And Mr. Tobin, you will get ten, won't you? You said you were anxious to help this association.

MR. TOBIN: Yes.

THE PRESIDENT: Even financially?

MR. TOBIN: Yes, Mr. President.

THE PRESIDENT: Now, you will get us ten members during the year?

MR. TOBIN: Well, I would not promise you.

THE PRESIDENT: But if you don't, if you promise to help us financially, you would "kick in" with the money, wouldn't you?

MR. TOBIN: Yes.

THE PRESIDENT: Yes, sure. Then you get ten members.

MR. TUCKER: Mr. President, I want to ask about the vice presidents from the different states. Are those still in existence?

THE PRESIDENT: Yes. The secretary said yesterday they had been changed every year.

MR. TUCKER: Why can't memberships be also increased through the vice presidents? Put it up to them.

THE PRESIDENT: Joseph A. Smith, of Utah?

MR. SMITH: Mr. President, I will guarantee ten.

THE PRESIDENT: Now, that's an exceptionally fine offer of Mr. Smith, who comes to us from Utah. Just try and fix in your mind the map of the United States and realize where Utah is. Mr. Rawnsley, you will get ten, won't you?

MR. RAWNSLEY: Yes, I will get ten.

MR. TUCKER: I will get ten. Carrie and I together will get ten.

THE PRESIDENT: There are two hundred right there.

MR. TUCKER: My ten went with your hundred. I think we ought to do something through the vice presidents.

THE SECRETARY: The secretary will get up a letter and send it to each one of the vice presidents, stating what was done at this meeting in the way of pledging these new members and asking the vice presidents to do the same, to each guarantee ten members or to turn the money in themselves.

THE PRESIDENT: If we had more money so that some of the officers of this association could get about and confer with our state vice presidents there isn't any doubt but what we could stimulate their interest and get many new members. Of course, ladies and gentlemen, we have got to get new members, that's all there is to it.

MR. O'CONNOR: The more the merrier.

THE PRESIDENT: What is the use? Here we are meeting with a deficit every year. That's all wrong.

MR. OLCOTT: Mr. President, I am glad something is going to be done about the state vice presidents. I also have proposed that

the state vice presidents be brought into line. Mr. Spencer has made a very good suggestion for them and that is to encourage friendly competition in dressing up yards, one section against another. If the state vice presidents would use that suggestion in getting new members I believe it would be a good thing. I believe also, as I have said many times that the state vice presidents should be the local directors of a state association subsidiary to this one, that Ohio, for instance, should have an association of Ohio nut growers. If they can't meet then let them correspond back and forth. Certainly the nut growers of Ohio should know each other and be brought in to correspondence. They could do that through an association of which our state vice president would be the chairman or the local president. I am a great believer in organization and I feel that the state vice presidents should amount to something. After the state organization is started by this association in that way, then the members of each association could elect their own chairman, if they wish, and report it to our secretary.

THE PRESIDENT: That is along the line of the suggestion offered by Professor Neilson this afternoon.

MR. OLCOTT: Yes. We could have a branch in Canada.

THE SECRETARY: The secretary will be glad to see that Mr. Olcott's suggestion is incorporated in the letters to the state vice presidents.

MR. JONES: We would be glad to make up a mailing list and turn it over to the secretary if he should want to circularize in making this offer or any other offer for memberships.

THE PRESIDENT: If we could get this thing where it ought to be it is possible that we might be able to induce the secretary to give his entire attention to the interests of the Northern Nut Growers Association. He would have to have a lucrative salary of course. That is one of my ambitions. I am frank to state it here right now.

Then the Northern Nut Growers Association would be the thing that it is supposed to be, the thing that it is not at the present time when we're meeting with a deficit every year. I hope and believe, in fact it must be, that this is the last time we are going to meet with a deficit. We are going to have a good surplus next year or what is the use of going on?

MR. SPENCER: The governors of three or four of the states met in Chicago not very long ago to consider the interests of the states that center around Chicago. The people in Illinois don't know that the Forest Reserve covers sixteen thousand acres and that it has English walnuts growing just as nicely as you have them here. That knowledge hasn't been spread. Also there are people who are propagating nut trees in Illinois and southern Indiana. Now if our vice presidents in Indiana, Illinois, Ohio and Missouri, which is the native home of most every kind of hickory, would get together and go to any one of the central cities of those particular states, call

a meeting of their customers in that neighborhood, and spread a knowledge of this association I think that we could build up a local interest that would advertise this organization wonderfully.

You have got to advertise and you must show to the common people who are going to be your members, who are going to be interested in nut trees, that they are valuable; that an ordinary acre of nut trees is worth ten times the value of any crop of wheat raised in Illinois, and Illinois is the wheat country. Before the hard wheat was discovered in Minnesota the whole south half of Illinois was given to wheat. But now so far as white wheat is concerned, and spring wheat, it isn't wanted and the result is that you have got to get something else into that country. Now that wheat country of southern Illinois is a natural nut country. Pecans, persimmons, chinkapins, grow wild all over there, and there is no reason why that land, which can be bought for from ten and fifteen dollars an acre up to twenty-five, according to the improvements, if the oil rights are eliminated, can't be made to produce a hundred to five hundred dollars an acre. If that is so, why not do it?

Today, Illinois has over 11,000,000 bearing apple trees, and they raise just as good apples there as any where, but they haven't got the organization, they don't advertise, and we don't know it generally. If we can organize and distribute our information, get these vice presidents from two or three cities to join with the chambers of commerce and have a meeting down at Evansville, among the nut growers, for instance, the growers of Indiana pecans, and see what they grow, and what they are worth, why then you can get the people interested. You must have somebody that is interested in the propagation of a new idea. Don't get somebody who just comes here for a good time without any desire particularly of learning anything. If he doesn't want to learn we don't want him.

The Secretary: I understand that, in view of the very generous offer of the president to get a hundred new members in the ensuing year, and of the pledge of ten other men to get ten more members, or turn in the necessary amount to the treasury, each of us goes forth from the meeting tonight with the understanding that he is morally under obligations to do what the other members have promised to do.

The President: It would be a nice thing to give a Christmas gift of a membership in this association and a subscription to the American Nut Journal. A great many of us receive Christmas gifts which are appreciated when received, and maybe for a week or ten days, two weeks or a month, and then they're forgotten; but this membership and the American Nut Journal that one would receive every month, would be a constant reminder of the giver. What do you think of that, ladies and gentlemen?

The Secretary: It is a fine idea, Mr. President, and I will see that it is also incorporated in the letters to the state vice president that each vice president give to at least one friend a subscrip-

tion and membership in the association. I suggest also that those who can write for the magazines and the journals get up little articles for the horticultural papers about nut culture. There can't be too many of those in the periodicals.

THE PRESIDENT: Apropos of that suggestion, I believe Mr. Tucker has something to say in regard to a special edition of the Journal. Maybe Mr. Olcott would be good enough to make one of his—

MR. TUCKER: (Interrupting) To make one of his numbers a convention number.

THE PRESIDENT: Yes; one of the numbers in the near future devoted largely to the proceedings of this convention, that is, if he could see his way clear to do it.

MR. OLCOTT: You mean in the matter of—

THE PRESIDENT: (Interrupting) Of this convention. Sort of make it a northern nut growers issue. It is merely a suggestion, Mr. Olcott.

MR. OLCOTT: Yes.

THE PRESIDENT: So that it is practically all about this convention of the Northern Nut Growers Association.

MR. OLCOTT: Yes. Well, it is rather difficult to do that, Mr. President, to the exclusion of all other matter. Is that what you mean? How are we going to take care of the news? It is not a magazine of stories and fiction; it is a magazine of news, and the news of the period between August 15th and September 15th, for instance, will become stale if it is not used in the September 15th issue and runs over until the October 15th issue. It is the American Nut Journal. I think your idea can be carried out very fully by featuring the convention as the main thing, but not to use every last page for it.

MR. TUCKER: No. My idea wasn't to give the whole magazine up to that. But when you got up that magazine, to have the northern nut growers convention stick right out.

MR. OLCOTT: Sure.

THE PRESIDENT: Wasn't it your idea to have some of the pictures, too?

MR. OLCOTT: I see.

MR. TUCKER: Yes; run some of the pictures, and so forth.

THE PRESIDENT: Mr. Olcott, I am sure, is willing to give that issue just as soon as we can get more members and more money.

MR. OLCOTT: We are carrying the nut journal on its subscription list. There is no advertising to speak of in this pioneer industry. The nut nurserymen do not advertise; they should. People want to know where they can get nuts, butternuts and hickory nuts. The people in the South who grow pecans are doing a commercial business but they don't have to advertise; they can't furnish enough nuts to meet the demand. There is no occasion for them to ask for customers; the customers are flocking to their doors and

standing in line. People want to know where to get black walnuts; they write in to me. I don't know where to send them. I don't suppose anybody has enough for his local trade and he doesn't have to advertise; he can sell all he has. There is no advertising to speak of. We are living on subscriptions. Now if you enlarge the Journal, use pictures which run up all the way from six to fifteen dollars apiece, you are soon using up your $1.50 per that is left out of the combination membership.

THE PRESIDENT: Yes.

MR. OLCOTT: After paying the tremendously high printer rates. A special edition can be gotten out at considerable additional cost. We have done it in the past and come out at the small end and it took several months to get even again. We can do it again for the sake of the association; but I am saying this to show why it is not done oftener.

THE PRESIDENT: Yes, I understand it. What do you think, then, of a little co-operation on the part of the association in the way of that extra expense for a special edition?

MR. OLCOTT: That's all right. In Mr. Linton's administration I furnished some very large and rather expensive half-tone engravings on the part of the association and they worked in very nicely. I don't know whether the association paid for them or whether he did. I think we divided the cost of them.

MR. BIXBY: I know he did. I have furnished some cuts myself.

THE PRESIDENT: Yes, I know, Mr. Bixby. You are very liberal.

THE SECRETARY: I suggested also that those who can give talks before their local horticultural societies should do so on the subject of nut culture, and if they wish to go in to it extensively slides could be obtained. I think that I could guarantee to obtain them from the Department of Agriculture for illustrated lectures. I have also another question which I would like to put before the association, and that is if we cannot use in some way our surplus back reports to gain new memberships. We have never been able to work out any method of doing so. We have printed each year an edition of a thousand numbers of the annual report. We send out two hundred and fifty or three hundred; consequently, we have about seven hundred annual reports accumulating on our hands every year. Now, what good are they going to be? Can't we use those in some way to increase our membership? Can't we use those as premiums, distribute them gratis some way or other, or distribute them for a small sum to educational institutions, newspapers and agricultural journals? Can't we do something with that annual surplus of about seven hundred nut reports to increase our membership?

MR. TUCKER: Why is there a thousand of them printed?

THE SECRETARY: Because you can get a thousand for just about the same price that you get five hundred, or a very little more.

MR. O'CONNOR: Mr. President, why couldn't some of those be sent to the different experiment stations; also to some of our libraries? We have a number of experiment stations that don't see anything of this kind and that don't know that such a thing exists as the Northern Nut Growers Association. It is only recently that within the state of Minnesota they knew there was such a thing. I have offered a prize in that state for nut culture work. This winter I am going to speak at the Maryland Horticultural meeting, which will be held in Baltimore, and wherever I can get a chance at any of those meetings I always put in a word for the nut. Over on the eastern shore of Maryland, I went into one of the largest apple orchards and nurseries, I believe, in the United States. There were a few northern pecans growing in the yard, and when I asked one of the young men what kind of pecans they were, he said, "Well, I don't know whether it is Indiana or just what it is; but I know it is a pecan." That was growing very beautifully right under the window, you might say, of their dwelling house. That was over at Berlin, at Mr. Harrison's. He likes to sell to nut tree owners, and yet has he come to his year's meeting? Is he a member of the association? For that reason I don't feel like helping him to sell a tree as long as he is not a member. But every chance I get I will put in a good word for the nut tree firm.

I think by sending out our literature to different magazines, to the different experiment stations and over into Canada we would be greatly benefited. We have got some good friends to the north of us. Why not send them some copies and have them help spread this good thing along?

THE SECRETARY: I would like to have Mr. Bixby state about the distribution of those reports outside of the membership. Is there any gratis distribution now?

MR. BIXBY: No, there isn't. There used to be and I made every one of them who received them gratis buy them of me.

THE SECRETARY: About how many institutions now buy the journal?

MR. BIXBY: I should say about half a dozen. That's the same number that had them free before. In nearly every instance when they would write in and request it I would tell them how the association was doing work the Department of Agriculture ought to do, supporting itself with great difficulty, and we would be glad to have them as a member; that if not a member we would furnish a report for so much. In nearly every case we got them as members or they bought the report. As I said before I don't believe in giving things away; I believe in trying to get the people to see the advantage of buying them.

THE SECRETARY: It would be quite an expense to send out all the back numbers of the reports.

MR. BIXBY: I don't think they would appreciate them either. Although I have not been able to do it the most practicable thing to do seems to me to make an index, say of the first ten and bind them up in a booklet and then I think you could sell them. I hope to do this some time.

MR. TUCKER: What is the expense of mailing?

MR. BIXBY: I think it is about eight cents.

THE SECRETARY: It would be considerable labor, but I think it might be best to circularize different experiment stations, horticultural societies, etc., and ask them if they wouldn't like to have in their libraries a complete file of the reports of the Northern Nut Growers Association which can be obtained for a certain small number of dollars.

THE PRESIDENT: Professor Neilson, what would your attitude be toward a communication you would receive of that nature? Supposing that you were not the enthusiastic member that you are of our association?

PROFESSOR NEILSON: I believe it would be favorable. I believe that is general, and judging from the interest shown in our province I believe that a good many of those horticultural societies and other organizations would be glad to have the reports on file; they would be glad to purchase them at whatever figure was set upon them, if it were a reasonable figure. And I think that I could interest several of our agricultural representatives in having these on file in their office, and possibly in subscribing, or getting the departments of agriculture to subscribe to the northern nut growers journal. There are several county offices along the northern shore of Lake Ontario and in those counties nuts are produced. I think their representatives might be induced to persuade the department to subscribe to your journal.

PROFESSOR TAYLOR: Mr. Chairman: I want to speak on the suggestion made by Mr. Bixby. I may illustrate it in this way: we people in California are, of course, in a little different situation from those represented by the Northern Nut Growers Association. Over there west of the Rockies, or west of the Sierra Nevadas, we have an entirely different situation. By virtue of our peculiar climatic conditions we have already gone through our experimental period and we now have nuts that we are growing on a commercial basis just as they have in the South.

For several years I was connected with the University of California and I used to have to teach students, among other things, the various nuts. That was my particular line, the various nuts, especially those adaptable to California, but also along with that the nuts of the United States and the nuts of North America. I believe that Mr. Bixby will bear me out when I say that it was during my time that all of the back reports of the Northern Nut Growers Association were ordered. That was prior to 1919, was it not?

MR. BIXBY: Yes.

PROFESSOR TAYLOR: It was prior to 1919 that all the back numbers were ordered, and I hope they are still taking them.

MR. BIXBY: They are. They get them every two years.

PROFESSOR TAYLOR: They ought to and if they are not I will see that they do. But I found this difficulty, that there will very shortly be thirteen numbers and if it comes to a question of looking something up, we will find that the average man will not be enthusiastically interested because he won't know how quickly he can get at just exactly what he wants. Mr. Bixby suggested that ten of these volumes be taken together and indexed as a unit. That is one of the finest things that you can possibly ask for. I think the institutions will buy them in a way that they do not now because then they will not have to look through ten volumes to find a little idea they want.

I know it is an expensive proposition to index things of that kind; it takes time and a lot of patience. Not only that but it must be done by some one whose heart is in the work and who recognizes the problems that the man who is going to use that index is going to look up. But I do think that if it could be put in to a combined volume, and some sort of an effort made by the various vice presidents in the different sections to see the institutions in their own sections who would be interested, that something might be accomplished which would be of real worth. I believe this would be increasingly so in the future, because those people will want to look back ten, fifteen, twenty years, and see what the others went through. One of the biggest things that I think I did in our classes was to point out the problems that occurred in California ten, fifteen, twenty-five and thirty years ago, along the line of nut culture solely, and then point out where the nut growers succeeded.

And if I may just branch off here to one of the things I haven't spoken about before this evening, I am absolutely against planting seedling trees unless there is a very strong emphasis laid on the fact that they are not for commercial purposes and not for planting in orchards, but are simply and solely for the possibility of developing new varieties. I think that growers are going to want to go back over old reports in order to save covering the same ground twice. We have found our new people in California starting right in where people started fifty years ago because they didn't know what happened fifty years ago, because our reports out there were not properly indexed.

MR. WEBER: Mr. President, in order to bring the matter to a head, I move that the distribution of the old reports, by sale or otherwise, be left to the discretion of the executive committee.

(Seconded and carried.)

MR. OLCOTT: Mr. President, I would like to ask what the condition of the treasury is. I do so for this reason, that we have planned out a good deal to be done during the interim, from now

to the next convention, and the secretary's office ought to be busy. We are planning upon making it so to keep up interest.

I think that the secretary shouldn't be handicapped by lack of funds for stationery and things of that kind. I think that with a deficit maybe he has been. Maybe more matter would go out if he had funds and to that end I am putting in my check for $20 for my subscription tonight in advance. If others will do that he will have funds to work with. (Applause)

THE PRESIDENT: In a discussion I had with the treasurer and the secretary before this evening's session we considered that point, Mr. Olcott, and I thought that we would go after the remaining deficit tonight and make it up, start off with a clean sheet. Mr. Bixby said that if we were going to enter into this new membership campaign in a really generous spirit, he felt that the matter of the remaining deficit should be taken care of.

MR. BIXBY: If we can get two hundred new members this year that will take care of it.

THE PRESIDENT: Two hundred are already pledged.

MR. BIXBY: If we get them that will take care of it.

MR. OLCOTT: It will take to the end of the year to get the returns.

MR. WEBER: I will send my check when I get home, because I don't want to go in to my pocketbook now.

THE PRESIDENT: What was the deficit, Mr. Bixby?

MR. BIXBY: The deficit was $176. There was pledged yesterday, $75, and there has been $10 more today. That's $85 of the $176. Then there is $20 of Mr. Olcott's. That would make it $105. Mr. Weber, when he gets home, will make it $125. We will clean it up one way or another.

THE SECRETARY: I think we should proceed now to the report of the nominating committee and the selection of the next place of meeting.

THE PRESIDENT: The hour is growing late and there is just one message I want to give you here. While it may savour some what of advertising our filbert enterprise, it was not with that idea in mind that we proceeded to get the information we have got. Our filberts have been distributed through the L. W. Hall Company, nurserymen of this city, who have exclusive sale of them at this time. They have been distributed during the past three years over a considerable area: Illinois, Idaho, Iowa, North Carolina, Massachusetts, Nebraska, New Hampshire, Ohio, Delaware, New York, Kentucky, West Virginia, Virginia, Georgia, District of Columbia, Pennsylvania and Kansas.

Some little time ago I conferred wih Mr. Hall in regard to communicating with his customers to whom he had delivered filbert plants, the first in the spring of 1919. He has written them asking them how the plants have done, and particularly with regard to fruit bearing. I have the replies here and the gist of them is this:

that the plants have done finely, have been entirely satisfactory in that respect. There has been a complaint that they have not borne; there are some instances of extreme pleasure expressed over the way they have borne. My own idea is, and I blieve it is that of Mr. Vollertsen also, that they have not had quite time enough yet, since the spring of 1919.

Mr. Bixby: That is not time enough.

The President: Furthermore, Mr. Hall, in offering them—against our advice as we endeavored to persuade him to offer them as improved European filberts, assorted varieties—thought that the people would be attracted to those unpronounceable names that we have them under. Maybe they were. He listed some six or eight varieties, I think, and those varieties were of our larger fruited kinds. We frankly confess that those varieties will not bear as abundantly as the smaller fruited varieties—not that they are very small they are quite a good sized nut. I believe if Mr. Hall had made a freer distribution of the so-called smaller fruited varieties that there might have been an even more favorable report in connection with fruiting. Another year or so will give us more definite information.

We have now cleaned up our program pretty well. You are going to find Doctor Kellogg's paper in the report, together with the secretary's. We have the papers here. That completes the program up to the present time with the exception of Senator Penny and Mr. Linton. We supposed Mr. Linton would be here. I had telephoned this morning as Mr. Penny promised to send a paper but he hasn't been able to do so. Those are the only two papers of the program that we haven't got.

There are two more things we have to take care of; one is the election of officers, and the other is the selection of a place for the next convention. I call for the report of the nominating committee.

Mr. Weber: The report of the nominating committee is as follows:

President:—James S. McGlennon.
Vice President:—J. F. Jones.
Secretary:—William C. Deming.
Treasurer:—Willard G. Bixby.

(Signed)

ROBERT T. MORRIS,
G. H. CORSAN,
HARRY R. WEBER,
Nominating Committee.

MR. O'CONNOR: I move the nominations be accepted.

THE PRESIDENT: Just one moment. Up to this evening I understood that the president was to be elected for a year. I do not know much about the condition prior to President Linton. He was elected at Battle Creek at the same time I was elected vice president. There were extenuating circumstances justifying the re-election of President Linton. I feel that similar conditions do not prevail justifying my re-election as president of this association. It is not going to make any difference to me whether I am president or just simply a soldier in the ranks. I want to see this association the success it ought to be and I feel, in view of the wonderful work that has been done in this association and for its best interests at all times by Mr. Jones, that it is due him that the presidency should be passed to him at this time. He is going to the next convention of the National Association of Nurserymen, he and Doctor Morris, Mr. Olcott and Mr. Weber, to get before that convention of nurserymen something more of the history of this association and its ambitions and desires. I know he could appear before that convention in a much more advantageous way for the benefit of this association if he were president of it. I feel that Mr. Jones ought to be elected president of this association here tonight.

MR. OLCOTT: Mr. President, the presidents of this association have been elected for two years and I think it has become an established custom.

THE PRESIDENT: Mr. Bixby referred to that tonight. I didn't understand it that way. I supposed I was elected last year at Lancaster for one year.

MR. O'CONNOR: Mr. President, I took that matter up with Mr. Littlepage and he told me it was customary to elect the president for one year at a time and to re-elect him for the second year if he proved all right. So far I think every member of this association has been well satisfied with the service you have given us and we want you to continue on for another year.

THE PRESIDENT: Pat, I thought you were my friend.

MR. SPENCER: I move the secretary cast the ballot of the association in favor of the officers nominated by the committee on nominations.

MR. O'CONNOR: I second the motion.

(Upon the motion being put to a vote of the members, it was declared duly CARRIED, the secretary cast one ballot for the persons nominated, and they were declared duly elected.)

THE PRESIDENT: All right, ladies and gentlemen. Here we are with our coats off and sleeves rolled up for another year; but I want to give you all fair warning that if we don't have that thousand memberships at that next convention, this child is going to drop out. (Laughter.)

The next in the order of business is the selection of a place for the next convention. You heard the telegram this morning from

Mr. Littlepage and the telegram from the Washington Chamber of Commerce. Personally, I would like to have you come to Rochester again because we sure enough have enjoyed the sessions with you all here this time. There is no finer city in the world than Rochester, N. Y., and we would like to have you come back here. I want you to come here.

MR. O'CONNOR: Mr. President, I feel it is quite an honor that we are asked to the capital city of the United States to hold our meeting. It shows we were appreciated there some few years ago. I move you we have the next meeting in Washington.

MR. OLCOTT: I second the motion.

(The motion being duly put to a vote of the members, it was carried.)

THE SECRETARY: Now, Mr. President, we should decide upon a date.

THE PRESIDENT: I think that is true. In Lancaster, last year, it was held later than this. I believe the ordinary time has been considerably later than this, about a month.

MR. O'CONNOR: Mr. Chairman, Mr. Littlepage asked me to say, after the convention city had been selected, that it would be best to make it about the last week in September as that would show the pecans and walnuts at about the right time.

MR. BIXBY: I move that the time of the next convention be fixed at September 26th, 27th and 28th, 1923.

MR. O'CONNOR: I second the motion.

(The motion being put to a vote of the members, it was declared CARRIED.)

There being no further business to come before the Convention, it thereupon adjourned.

PROCEEDINGS OF THE TREE PLANTING CEREMONIES AT HIGHLAND PARK, ROCHESTER, N. Y.

September 9th, 1922, 11 A. M.

PRESIDENT MCGLENNON: This occasion represents the custom of the association of planting a nut tree in one of the parks of the community in which the annual convention is held. We had expected to have some black walnut seedlings grown from nuts presented to ex-President Linton by the superintendent at Mount Vernon, Washington's old home. I am not sure but I have quite a vivid remembrance that the trees from which these nuts were gathered were fruiting in Washington's time. However it would be a very delightful time if we could have such trees to plant in memory of that great character. But I am sorry to say that we have been disappointed in not receiving the trees from Mr. Linton. He expressed them from Saganaw the day before yesterday and we have made diligent effort to locate them in this city this morning but have been unable to get any trace of them. Anticipating such a happening Mrs. Ellwanger, who had on exhibition at the convention some Persian walnuts grown in pots, at our request very kindly consented to let us use one of those trees. If we had had a little more time to consider it undoubtedly Mr. Dunbar would have arranged to have this tree planted on the land that was given to the city by George Ellwanger, Mrs. Ellwanger's father-in-law, and Patrick Barry of the world famed nursery of Ellwanger & Barry. We are going to plant one of these Persian walnut trees here (the planting is now going on) and there is a greater likelihood that this tree will live than the black walnut, as that tree had to be dug and transported. We feel reasonably sure that this tree will live to commemorate our meeting in Rochester this year.

We are also going to plant an Arkansas hickory, that Mr. Dunbar has had dug from the park nursery, a short distance from where the walnut is planted. I think this, too, is an appropriate tree to plant because of the success of the hickory in this community. Mr. Dunbar tells me that practically all of the varieties of hickory of North America are planted on this park slope. We took great pleasure in driving through here the other day and listening to an explanation of their history by Mr. Dunbar.

We are honored to-day by the presence of the Dean of the New York State School of Forestry, Dean Mann, who has consented to address us. It gives me great pleasure to introduce to you Dean Mann.

DEAN MANN: President McGlennon, ladies and gentlemen:

I assure you it gives me great pleasure to be here because as a forester and tree lover by profession I am also a tree lover by nature.

I can conceive of no more worthy, more beautiful nor attractive memorial than a tree dedicated to the Father of our Country, something which will grow in size, in beauty and in productivity as the years roll by. As foresters would remind you, ladies and gentlemen, the Father of our Country served his apprenticeship long before he became a land owner and patriarch on those broad Virginia acres. The Father of our Country started out in life as a forester and surveyor. You may remember that he piloted, or was to be one of the pilots of Braddock's expedition, having gained his knowledge of the woods through his early life as a young surveyor in the forests of Virginia.

There are in New York state approximately fourteen million acres better suited to tree crop production than to field crop production. Here in the northeastern corner of the United States, where our great centers of population are found, we have in the state of Maine seventy per cent. suited to tree crop production but unsuited to tillage; we have similar conditions in Massachusetts and Connecticut. Throughout this northeastern section of the country we have a tree soil domain which will grow trees and which can't be plowed with profit. All who are interested in the production of trees for whatever purpose should realize that this nation cannot permanently prosper unless every acre of its land is put to its best permanent use.

I think that you will agree with me that it requires no prophetic eye to see the day not far distant when we will have, stretching from the Island of Manhattan up to where Albany now stands, one vast series of teeming cities with suburb touching suburb. The problem then will be how to feed this multitude. Developments in Russia show that, no matter how idealistic one's theory of government may be, food, in the last analysis, is the thing which makes or breaks a nation.

Those of you who have studied some of the interpreters of early Scripture will remember, perhaps, that the Garden of Eden was in reality an oasis of trees in the great valley of Mesapotamia, and even today "garden" in the oriental term means a group of trees. It has been proven by experience in these different tropical realms that where tree production is biggest and nuts and other products are grown under intensive cultivation, an acre will produce more food than where grazing is practiced. I spent a very pleasant year in California and saw some of the operations of the California nut growers, where they are growing English walnuts on a most extensive scale. I believe I will be making no false statement when I say that those areas in southern California which are growing nuts produce more in fats, proteins and calories for the maintenance of the health and strength of the human race than do the acres which are given up to the growing of animal crops.

So I applaud the idea of planting a tree in the memory of the Father of his Country. I believe I belong to your group, at least

through interest, because I have been doing a little experimenting of my own in my back yard at Syracuse where I have an English walnut which I planted in 1915 which is this year producing for the first time. I am going to take those nuts and see what can be done with them in perpetuating that particular variety, because it is hardy, fast growing, and early to mature.

The New York State College of Forestry has a platform as broad as the entire state. We are interested in every kind of land which is not suited to agriculture, fish, game, recreation, conservation of water, and I pledge to you the sympathy and the support of the New York State College of Forestry. We have three experiment stations; one in Oneida county, one in Onandaga county, and another in Cattaraugus, with a fourth in St. Lawrence, if you wish to call it such. We would be delighted to receive from you any slip or any sort of fruit which you wish us to try out at these experiment stations. I believe that the time will come when some combined system of forestry and horticulture can be maintained which will aim at the production of food stuffs from trees, with lumber, perhaps, as a by-product. That works out in the old country and the day is not far off when it can be practiced here.

I congratulate the members of this association on having completed what was, from all accounts, a most successful meeting. I regret that I couldn't have been here earlier and met the other members of your body. I congratulate you; I wish you God speed, and I again tender the support of the College of Forestry.

President McGlennon: We certainly have received great encouragement from Dean Mann's remarks, which to me, and I believe to all present, were most interesting and instructive.

I want to hear just a few words from our esteemed friend, Mr. John Dunbar, Assistant Superintendent of Parks.

Mr. Dunbar: I think it is a very happy and fortunate circumstance that Mr. Mann is here this morning representing the College of Forestry of Syracuse. Every word that Mr. Mann has said is absolutely true. The forestry question of this country is indeed a very serious question. Every man, and every woman, should give most serious thought to it, and I hope the words Dean Mann has spoken to us here this morning will go in to all our hearts very deeply.

Of course the Park Department is studying trees from the ornamental and arboricultural point of view. We think, however, that arboriculture, horticulture and forestry, as the Dean said, are very, very closely allied and should surely work together. I think his idea is a very excellent one; that there should be a very close connection or union between forestry, horticulture, nut culture, and all kinds of fruit culture. I hope that day is not far distant.

President McGlennon: Ladies and gentlemen, the treasurer of our association is a man who is intensely interested in nut culture.

He has done wonderful things for its advancement and especially for the advancement of the interests of the Northern Nut Growers Association.

Mr. Bixby: While Dean Mann was speaking the thought came to me, how could we better co-operate with the Department of Forestry? I think the work of the Nut Growers Association, which is particularly interested in the use of nut trees for orchards, and that of the Department of Forestry, which looks upon them particularly as producers of timber, could be very closely allied. The thought came to me, could not we right here work out some practical suggestion whereby we two could co-operate? I would like to ask Dean Mann what nut trees they are planting for forest purposes.

Dean Mann: We have done very little. We have, at our experiment station at Chittenango, done some work with the English walnuts. This particularly hardy specimen that I have in my own back yard—I have two, one of them is growing very slowly—are from our experiment station. We have really had so much to do in the way of popular education in New York State in the timber products, that we are merely, as they say in the South, fixing to begin with other things. That is the only species with which we have made an actual start. There is this however: what can foresters, horticulturists and nut enthusiasts do to supply the place of the American chestnut? I really came here as a seeker after truth on this particular phase. You men probably know more about it than I. What can we produce? Is there any hybrid which can be introduced into this country which will take the place of the American chestnut?

Mr. Bixby: In reply to that I would say that I have hundreds of seedlings of the Chinese chestnut on which the blight has been working for years and has not destroyed them. I would be very glad to send them to the College of Forestry and let you try them.

Dean Mann: They will be planted with extreme care and a barbed wire put around them.

Mr. Bixby: There is another thing, the rough shell Japanese walnut, so-called, which is really a butternut hybrid. I have planted it and it is growing at a tremendous rate, even faster than the Japanese walnut. I expect to get a lot of those nuts this year and I wondered how the College of Forestry would like to try some of them.

Dean Mann: I would be delighted.

Mr. Bixby: Then there is one other nut the big shell bark hickory which is a native of the Mississippi Valley, which has been planted in Pennsylvania and up in Lockport, New York. It grows finely, it bears early, and I think that it might be worth trying.

Dean Mann: We have adopted this platform: "Anything which will interest the people of New York State." We must, as a state institution, limit our horizon very largely to the state of New York. We do slip over occasionally, but anything which will interest the people of New York State in trees of any kind, for any purpose, is a step towards forest conservation. Take your city dweller in New York City, get him interested in a shade tree in front of his apartment house, or in a group of shade trees in the adjoining park, and you have converted that man along the line of King Forest. So we will be very glad to take any seeds you have and give them excellent care.

NUTS THE NATURAL AND ADEQUATE SOURCE OF PROTEIN AND FATS

By

John Harvey Kellogg, M. D., F. A. C .S.,

Medical Director of the Battle Creek Sanitarium

In the writer's opinion, the most important thing which can be done to promote the nut growing industry is to make clear to men and women everywhere the necessity for returning to natural and biologic living. Since he left his primitive state, in his wanderings up and down the face of the earth to escape destruction by terrific terrestrial convulsions and cataclysmic changes in climate and temperatures, chilled during long glacial periods, parched and blistered by tropic heats, starved and wasted by drouth and famine, man has been driven by ages of hardships and emergencies to adopt every imaginable expedient to survive immediate destruction, and in so doing has acquired so great a number of unnatural tastes, appetites and habits, perversions and abnormalities in customs and modes of life, that it is the marvel of marvels that he still survives.

Man no longer seeks his food among the natural products of field and forest and prepares it at his own heartstone, but finds it ready to eat, prepared in immense factories, slaughter-houses, mills, and bakeries and displayed in palatial emporiums. No longer led by a natural instinct, as were his remote forebears, in the selection of his foodstuffs, he finds his dietetic guidance in the advertising columns of the morning paper, and eats not what Nature prepared for his sustenance, but what his grocer, his butcher and his baker find most for their pecuniary interest to purvey to him. The average man no longer himself plants and tills and harvests the foods which enter into his bill of fare, that is, "earns his bread by the

sweat of his brow," but accepts whatever is passed on to him by a long line of producers and purveyors who do his sweating for him, depriving him of the opportunity of earning both appetite and good digestion by honest toil. So he resorts to condiments and ragouts, palate-tickling and tongue-tickling sauces and nerve-rousing stimulants, as a means of securing the unearned felicity of gustatory enjoyment.

At the World's Eugenics Congress held in New York last fall, Professor Davenport expressed the opinion that the human race will ultimately perish, and Major Darwin, son of Charles Darwin, one of the world's leading economists, gave expression to similar views. We are evidently traveling a downhill road and the tide of degeneracy is rising so fast it will certainly sweep us on to race extinction unless we return to sane and biologic living. We are primates, not carnivores like the dog, nor omnivores like the hog. The primates are fruit and nut eaters in whatever part of the world they are found. All the primates adhere to the family bill of fare. The gorilla, reigning king of beasts in the forests of the Congo, his somewhat lesser relative, the chimpanzee, which tenants a wide area of the Dark Continent, the orang-utan of Borneo, and the gibbon of tropical Asia, diversified as they are in form and habitat, are all equally circumspect in their adherence to the diet of nuts and fruits, tender shoots and soft grains, foods which Nature has prescribed as the primate's bill of fare.

A return to natural eating would doubtless do, to say the least, as much as any one thing toward checking the downward race movement, and no one who has ever studied the economics of diet will question that the only way in which the earth's dense populations of the future can be fed will be by the elimination of the flesh-pots and a resumption of the natural dietary. This is clear when we recall the fact that the Agricultural Experiment Stations have demonstrated that 33 pounds of digestible foodstuffs are required to make one pound of beef. When an animal is fattened, the creature uses a large part of the food which it consumes for its own purposes. The eater of flesh does not get back the original corn and other foods given to the animal but only a small fraction of it; and hence dense populations can only indulge in beef eating by importing meats from other countries not yet fully occupied. Evidently, the present rapid increase of the earth's population will soon bring us to a point where this enormous waste must cease. Flesh eating will have to be abandoned for economic reasons. Even the milk supply will necessarily be limited, for we are compelled to feed the cow 5 pounds of digestible foodstuffs to obtain 1 pound of water-free food in the form of milk.

Those pessimistic economists who predict that by the year 2000 the American Continent will be so densely populated that means will have to be adopted to limit the increase of population because of the scarcity of foodstuffs, are evidently not aware of the

activities of the Nut Growers Association and of the marvelous efficiency of nut trees as producers of protein and fats, the two elements of our foodstuffs which are most costly because hardest to produce.

I am creditably informed that one acre of land supporting 35 black walnut trees in full bearing, will produce not less than 350 pounds of walnut meats, each pound of which has a nutritive value in protein and fats fully four times that of an equal weight of beef or an equivalent of 1400 pounds of meat. To produce a steer weighing 1600 pounds, requires two acres and two years. Two acres and two years will produce 1400 pounds of nut meats, the equivalent of 5600 pounds of beef or more than 9 times the amount of nutritive material in the form of protein and fat produced by beef raising.

Of course, the question might be raised whether nuts as a source of food are equal in value to meats, which supply the same sort of food material, namely, protein and fats. If the anthropologists are right, this is a question which need not worry us, for, according to Professor Keith, the eminent English anatomist and a leading paleontologist, and Professor Elliot, of Oxford, nuts were the chief staple of our hardy ancestors of prehistoric times. Professor Elliot, indeed, tells us in his work, "Prehistoric Man," that the first representatives of the human race who appeared in the Eocene Period were fruit and nut eaters, and were abundantly supplied with this sort of nutriment. This eminent author says,—

"On the bushes by the rivers and along the shore there were all sorts of fruits and nuts. For the subsistence of our lemur-monkey-man in the early stages of evolution, what fruits would seem *a priori* most suitable?

"I think that one would select the banana and bread-fruit. Ancestral forms of both were flourishing in the Eocene. Many other fruits with which man has been afterwards continually (perhaps one might venture to say *most intimately*) associated, occur at this period. These are, most of them, found in so many places that one is apt to think they were then of world-wide distribution.

"In the temperate brushwood and on the river-sides, acorns, hazel-nut, hawthorne, sloe, cherry and plum might be found. Here and there, he might alight upon a walnut or an almond; figs also of one kind or another seem to have been common. Palm trees existed, and some of them were of enormous size."

If, in modern times, nuts have come to be used as a luxury rather than as a staple article of diet, it must be because we have neglected to cultivate this choicest of food products which Nature is ready to provide with a lavish hand when invited to do so by our co-operation. But as the public become better informed respecting the high food value of nuts and especially in view of the steadily rising cost of flesh meats, the nut is certain to gain higher appreciation, and the writer has no doubt that some time in the future nuts

will become a leading constituent of the national bill of fare and will displace the flesh meats which to-day are held in high esteem but which in the broader light of the next century will be regarded as objectionable and inferior foods, and will give place to the products of the various varieties of nut trees which will be recognized as the choicest of all foods.

In nutritive value the nut far exceeds all other food substances; for example, the average number of food units per pound furnished by half a dozen of the more common varieties of nuts is 3231 calories while the average of the same number of varieties of cereals is 1654 calories, half the value of nuts. The average food value of the best vegetables is 300 calories per pound and of the best fresh fruits grown in this country, 278 calories. The average value of the six principal flesh foods is 810 calories per pound or one-fourth that of nuts.

Recent studies of the proteins of nuts by Osborne and Harris, Van Slyke, Johns and Cajori, have demonstrated that the proteins of nuts are at least equal to those of meat. This has been shown to be true of the almond, English walnut, black walnut, butternut, peanut, pecan, filbert, Brazil nut, pine nut, chestnut, hickory and cocoanut; that is, of practically all the nuts in common use.

Observations seem to show that, in general, the proteins of oily seeds are complete proteins.

Cajori's research has also shown the presence of growth-promoting vitamins in abundant quantity in the almond, English walnut, filbert, pine nut, hickory, chestnut and pecan.

That the nut is appreciated as a dainty is attested by the frequency with which it appears as a dessert and the extensive use of various nuts as confections. That nuts do not hold a more prominent place in the national bill of fare as food staples is due chiefly to two causes; first, the popular idea that nuts are highly indigestible, and second, the limited supply.

The notion that nuts are difficult of digestion has really no foundation in fact. The idea is probably the natural outgrowth of the custom of eating nuts at the close of a meal when an abundance, more likely a super-abundance, of highly nutritious foods has already been eaten and the equally injurious custom of eating nuts between meals.

Neglect of thorough mastication must also be mentioned as a common cause of indigestion following the use of nuts. Nuts are generally eaten dry and have a firm hard flesh which requires thorough use of the organs of mastication to prepare them for the action of the several digestive juices. It has been experimentally shown that nuts are not well digested unless reduced to a smooth paste in the mouth. Particles of nuts the size of small seeds may escape digestion. Nut paste or "butter" is easily digestible.

Delicious nut butters may be prepared from true nuts such as the almond, filbert and pine-nut, by blanching and crushing, with-

out roasting. Peanuts require steam roasting. Over-roasting renders the nut difficult of digestion.

More than 50,000 tons of nut butters are produced in England every year. Peanut oil, palm kernel oil and coconut oil are the principal raw materials used. In face of vanishing meat supplies, it is most comforting to know that meats of all sorts may be safely replaced by nuts not only without loss, but with a decided gain. Nuts have several advantages over flesh foods which are well worth considering.

1. Nuts are free from waste products, uric acid, urea, and other tissue wastes which abound in meats.

2. Nuts are aseptic, free from putrefactive bacteria, and do not readily undergo decay either in the body or outside of it. Meats, on the other hand as found in the markets, are practically always in an advanced stage of putrefaction. Ordinary fresh, dried or salted meats contain from three million to ten times that number of bacteria per ounce, and such meats as Hamburger steak often contain more than a billion putrefactive organisms to the ounce. Nuts are clean and sterile.

3. Nuts are free from trichinae, tapeworm, and other parasites, as well as other infections due to specific organisms. Nuts are in good health when gathered and usually remain so until eaten.

In view of these facts, it is most interesting to know that in nuts, the most neglected of all well known food products, we find the assurance of an ample and complete food supply for all future time, even though necessity should compel the total abandonment of our present forms of animal industry.

Another of the great advantages of the nut is that with few exceptions, it may be eaten direct from the hand of nature without culinary preparation of any sort. Indeed, the common custom of offering nuts as dessert is an acknowledgment that in the nut the refined chemistry of Nature's laboratory permits of no improvement by the clumsy methods of the kitchen.

Every highway should be lined with trees. Many nut trees will grow on land unsuited to ordinary farm crops. The pinon flourishes on the bleak and barren peaks of the Rockies.

A few nut trees planted for each inhabitant would insure the country against any possibility of food shortage. A row of nut trees on each side of our 3,000,000 miles of country roads would provide half enough fat and protein for a population of 100,000,000.

If each one of the 6,000,000 farmers in the United States would plant and maintain an orchard of ten acres of black walnuts, the annual crop, with little or no attention, would yield not less than 3,000,000 tons of nut protein, the equivalent of more than 12,000,000 tons of meat, besides more than 6,000,000 tons of fat of the finest quality, sufficient to supply every one of 100,000,000 people with an

ample amount of protein, and, in addition, the fat equivalent of 6⅔ ounces of butter.

Nuts should be eaten every day and should be made a substantial part of the bill of fare. So long as the nut is regarded as a dainty, suitable only for dessert, the demand will be limited. But as its merits come to be appreciated, it will be in greater demand and the supply will rapidly grow in volume.

The Lime Content of Nuts

In proportion to their weight, nuts contain more lime than any other class of foodstuffs except legumes, the average being more than one-third grain to the ounce (.370 grs.). Certain nuts are surprisingly rich in lime. For example, the almond affords one and one-third grains of food lime to the ounce, while the hazel-nut or filbert affords one and three-quarters grains of lime to the ounce, or 11.3 per cent of a day's ration of lime. The pecan and the walnut are also fairly rich in lime, as is also the peanut.

An ounce and a half of each of almonds and hazel-nuts or filberts will supply one-third the total lime requirement for a day. In general, this addition to the ordinary bill of fare would be quite sufficient to insure against any serious deficiency of lime.

Meats of all sorts are poor in lime. The lime in animals is almost exclusively in the bones. One ounce of almonds, for instance, contains as much food lime as a pound of the choicest steak, and a quarter of a pound of black walnuts supplies as much food lime as nearly two pounds of average meats.

The Iron Content of Nuts

The almond, hazel-nut, chestnut, peanut, pecan and walnut, all contain a rich store of iron, the average iron content expressed as per cent. of the iron ration being 4.79, more than two and one-half times that of fruits (1.74), three times that of vegetables (1.46), greater than that of cereals and even superior to average meats. It is true that the extraordinarily high food value of nuts renders them less available than fruits as prime sources of iron, for one would have to eat 5,000 calories of chestnuts or walnuts or more than 4,000 calories of pecans or peanuts to get a day's ration of iron; but three quarters of a pound of almonds or hazel-nuts would supply the needed quantum of iron with an energy intake of 2,500 calories, on account of their unusually rich store of iron.

It is worth while to know that vegetable milk prepared from almonds, by adding five parts of water to one part of blanched almonds made into a smooth paste, supplies two and a half times as much iron as does cow's milk in equal quantity, and furnishing the same amount of protein. It is worth noting, just here, also, that the protein of the almond is, like that of milk, a complete protein, that is, a protein out of which human tissues may be readily formed, which

is by no means true of all vegetable proteins. Such a milk, however, would be somewhat deficient in lime, a lack which could be supplied by lentil soup.

A product commercially known as Malted Nuts, prepared from almonds or peanuts, has been found of very great service in meeting the needs of infants and some classes of invalids for an easily digestible liquid nourishment to take the place of milk when a substitute is needed.

The chief obstacle which at the present time stands in the way of making nuts a food staple is the meager supply. If the population of the United States should suddenly turn to nuts as the chief means of meeting their protein requirement, the total annual crop of nuts would be consumed in a day or two, or possibly less time. The American people readily change their eating habits. As nuts become more plentiful through the efforts of the Nut Growers Association, and the general enlightenment of the people concerning the superiority of this class of foodstuffs by a well conducted propaganda such as has been carried on in behalf of the raisin industry and such as the meat packers are now conducting in their effort to induce the American people to eat more meat, but of course on an honest, scientific basis rather than by means of untruthful and misleading statements, as the packers are doing, the intelligent people of this country could soon be brought to an appreciation of the great value of edible nuts and the important place which they should fill in the bill of fare.

Thirty years ago, the writer prepared a paste from peanuts which had been previously cooked by steaming or baking, and gave to the preparation the name of "Nut Butter." Little attention was paid to the product for two or three years, then it began rapidly to win favor and, according to a recent report by the Census Bureau, 56 establishments, in 1919, produced peanut butter to the value of nearly $6,000,000, and the peanut crop last year was 816,464,000 pounds. In 30 years, the peanut crop has increased from a few thousand acres to nearly 2,000,000 acres, and the peanut has come to occupy a place on the national bill of fare of considerable prominence. The peanut is not really a nut but a legume and is in flavor and other edible qualities greatly inferior to the products in which this Association is interested. Nevertheless, the fact that it is accessible has given it an opportunity to quickly gain popular favor. The writer feels very confident that if this association and other similar organizations will continue their efforts in behalf of nut growing, and will at the same time adopt measures to inform the public concerning the remarkable nutritive properties of these products which have been created expressly for the use of man and which are so wonderfully adapted to his sustenance, there will be a steady advance in their acceptance by the public and in the not far distant future, the raising of nuts will come to be as nearly universal among farmers as the production of apples or other fruit crops. If the

uncultivated lands of this country not now occupied as farms were occupied by nut trees in good bearing, the annual crop of nut protein and fat would be amply sufficient, in connection with the corn, wheat and other crops harvested by our 6,000,000 farmers from our big billion acre farm to easily support a population of 1,000,000 persons. If the nut is given a chance, it will not only save the human race from perishing from starvation, but will give it a good boost upward in the direction of race betterment.

The Eat More Meat campaign which the packers are now conducting and for the support of which they at their recent convention in Kansas City, voted to raise a fund of $500,000, is being carried on by the grossest chicanery and misrepresentation. Pseudo-scientific men are being put before the public as great authorities in human nutrition and these men are sending out plausible but most misleading eulogies of meat as a foodstuff possessing essential qualities for the lack of which the American people are suffering. The only possible reason for these frantic appeals to the American people to consume more meat is the depletion of the packers' profits by the steady decrease in meat consumption which has been going on for a number of years and which begins to threaten the future development of their industry. The public will be damaged rather than benefited by an increase of meat consumption. A nation-wide campaign in behalf of the almond, the hazel-nut, the walnut, the pecan and other of our native nuts would unquestionably improve the health and vigor of the American people, provided the nut growers will supply the demand which would be created.

August 12th, 1922.

Dear Dr. Deming:

I have received your letters. I am sorry to answer you very late, because on March 28th my wife died. I have been again heart broken and delay everything for these few months.

I have not yet met Mr. Read, I went to the U. S. Consulate to find him, but no definite answer received yet.

The place Chuking is rather inconvenient to reach from Shanghai. I am gong to buy land near Shanghai i. e. one hour trip from business center. When I succeed that, I will remove all trees out.

I am sending you separate paper that you want for the convention.

The seeds that I sent you last year is Castanopsis sp. grows near Hangchow, 100 feet high and ever green.

Yours very sincerely

P. W. WANG.

CHINESE NUTS—WALNUT

P. W. Wang

Kinsan Arboretum, Chuking, Kiangsu Province, China.

Historic research by Berthold Laufer in his "Sino Iranica" published by Field Museum of Natural History of Chicago is very valuable. His conclusion is that China is not the original home of walnuts but imported from Persia via two routes, the earlier by Chinese Turkestan and little later by Tibet. I recommend every member to read this book. It contains many valuable historical informations about trees and vegetables in Asia.

According to the recent travel of late Mr. F. N. Meyer no grafting or budding of nut trees yet practiced in China. The walnuts varied from thinnest shell like peanut or hard shell with poor flavor. The Chinese walnut are proved to be hardier than Persian walnut in America.

There is no walnut in this province except a few in ornamental gardens. What we can get is through grocery stores. They imported them from Tientsin or Tsintao. The former is easy to crack with fine flavor and the kernel color is light. The latter is hard to crack, the internal partition has a peculiar construction that the kernel is very hard to take out even in broken pieces and the kernel has a brown color with the taste of bitterness and astringency. That shows that the walnut in Chili is far superior to that of Shantung. I do not believe that the above difference is due to the latitude, because there is one walnut tree in a garden in Soochow, a big city 50 miles from Shanghai, the nut is very good.

The Chinese way of eating walnut is just like Americans. One thing that coincides with Dr. Kellogg's treatment to a Senator's daughter. In China there is no baby fed by cow's milk. When the mother lacks milk and the home is not rich enough to hire a milk nurse, walnut milk is substituted. The way of making walnut milk is rather crude here, they simply grind or knock the kernel into paste then mix with boil water. I wish to learn Dr. Kellogg's way of making walnut milk.

One tradition that believed by most Chinese even well educated Chinese for thousands years that if you eat walnut constantly, your life will be prolonged, and if you only eat fruits and nuts excluding all provisions other than produced from trees even rice and wheat your life will be eternal. I must recall the theory of Dr. Kellogg that may be the proof of the above tradition. "Beef fats is deposited in the tissue as beef fats without undergoing any chemical change whatever; mutton fat is deposited as mutton fat; lard as pig fat etc." Perhaps the influence of animal fat reduces the life as animals are generally short lived and nut fats increases the life as nut trees live for centuries.

Chinese walnuts are sometimes met with very good ones, moreover they are hardy and free from insect or fungus attack. They are really worth while to propagate. As I can not get propagate nor scions I am now planting seedling from best nuts. I wish you are doing the same work and finally we can supply the colder world with suitable walnut trees.

I suggest one plan that I know very big amount of walnuts of best quality are exported from Tientsin to the States. You can secure the best ones by selecting from the walnut importers for planting.

There is another walnut produced in the vicinity of Hangchow Carya Catheyensis, really a hickory, last year I sent to Mr. Jones for 50 lbs. The taste is far below that of Pecan, but just 3 months ago I ate at a friend's house. The hickory kernel was roasted with sugar syrup. It lost all bitterness and has a very good hickory taste with fine hickory flavor.

Ptero-carya stenoptera grows best among any other trees in this region. It resists drought very well. I like to try to use it as stock for grafting.

I do not interest in chestnut yet. As far as I know the best chestnut is produced in Lian-Shang near Tientsin.

Castanopsis from Hangchow is very nice. They said the tree is over 100 feet high and is ever green.

Hazelnut is from Chili and North. They are not so good as yours.

Chinese almond is apricot kernel, the best one is from Pekin or Tientsin.

Ginkgo nuts are never eaten afresh, we eat them sometimes roasted and most times cooked with meats. In which you will find both meats and nuts of good taste.

I like Torreya Grandis very much, I think Americans do not like it because they do not use the right way. Chinese roast the Torreya nut until all moisture gone then wait they are cold and eat them. They must be kept dry after roasted otherwise the taste is not so good and a second roast is necessary.

I hope you will try the above two kinds nuts by the above way, as Ginkgo can live over thousand years and Torreya in this country is also long lived, their nut fat would keep the human tissue less easy to decay.

The pine seeds kernels are sold here for Mex. $1.60 per pound. If your pine seeds kernel are cheap, it is possible to come over. The pine seeds are Pinus Bungeana ans P. Massoniana.

RESOLUTIONS ON THE DEATH OF

Dr. Walter Van Fleet

At the thirteenth annual convention of the Northern Nut Growers' Association, held at Rochester, N. Y., September 7, 8 and 9, 1922, a committee was appointed to express the sorrow of the association at the death of its honorary member, Dr. Walter Van Fleet, at the age of sixty-four, on January 26th 1922, and to inform Mrs. Van Fleet of its action.

Dr. Van Fleet, at one time the only honorary member of the association, was made so in recognition of his services to nut growing in breeding blight resistant chestnuts and chinkapins, and of his unfailing courtesy to the association whenever asked to present the results of his investigations.

Although incomplete his experiments had already produced results of great promise and shown the way that his successors must follow. Many of us knew him personally and had visited his home and experimental grounds at Bell, Maryland, some of us more than once. Few of us knew his varied and high attainments in many other fields than plant breeding, though a moment's thought would have made a discerning person see that his modesty, self-effacement, kindliness and sympathy were things that most often come to those whose experiences of life have been the widest. His accomplishments in plant breeding and other fields, a bibliography of his writings, and the events of his life, were fully and sympathetically related in a communication written by Mr. Mulford of the U. S. Dept. of Agriculture at the request of the association and read at the meeting.

The association feels that no one can ever quite take the place of Dr. Van Fleet in the field of his life work, in experimental nut breeding and in the hearts of the members of this association who had the privilege of knowing him, and it wishes to put on record its great sorrow at his untimely death in the very midst of his beneficent activity for the benefit of mankind.

RESOLUTION ON THE DEATH OF

Coleman K. Sober

At the thirteenth annual convention of the Northern Nut Growers' Association, held at Rochester, N. Y., September 7, 8 and 9, 1922, a committee was appointed to express the feeling of the association at the death of one of its life members, Coleman K. Sober, at the age of seventy-nine, at his home in Lewisburg, Pa., in December 1921, and to inform his family of its action.

Colonel Sober, as he was most often called, was a frequent attendant at the meetings of the association in its early history. He was a pioneer in the culture of the chestnut in America and the grower and distributor of a variety which he called the Sober Paragon. He developed the production of this valuable variety, and its nursery stock, on a large scale and had demonstrated chestnut growing as the first of the established nut industries in the north-eastern United States. He devised methods of grafting and cultivating the chestnut and invented means and machinery for harvesting and shelling the nuts, for which he found a ready market at good prices.

A man of strong personality, capable of large operations and unaccustomed to failure he found it hard to admit defeat of his deeply cherished purpose, and success already within his grasp, by that great national calamity the invasion of this country by the fatal chestnut blight. Undoubtedly he foresaw, as did other advocates of nut culture, the great help and stimulus to the industry that would result from the commercial success of chestnut culture, and it was a bitter disappointment to him to find himself helpless before the irresistable progress of the blight. This failure came too late in life for him to recover and develop new fields in nut culture which, let us believe, he would have done if he had been younger, for we know that he was an advocate of the roadside planting of nut trees and a supporter of the efforts of those of us who are striving for the success of all forms of nut culture.

Nut growing and this association have lost an able and energetic worker.

An account of Col. Sober's life and works may be found in the August 1922 number of the American Nut Journal.

Telegram from Washington, D. C.

To JAMES S. McGLENNON:

Deeply regret my inability attend thirteenth annual meeting. Am sure it will be great success and all will enjoy trip to your beautiful city and surrounding country. The next few years will show fine results of efforts our Association, and nut culture in north will take on new life and result in planting thousands of acres trees. I hope Washington will be selected as place for next annual meeting.

T. P. LITTLEPAGE

Lincoln, Nebraska, September 5, 1922

My Dear McGlennon:

Nothing would give me greater pleasure than to be in your city this week. I have been through your city five times in three years. If I had known what you have there I should have stopped there three years ago. Since it is impossible for me to be there at this time I will save my coin to purchase trees and nuts for next year.

Dr. Deming's wonderful discovery of a monster pecan tree in Hartford, Conn., together with native pecans north of Burlington, Iowa also two Iowa pecan trees growing in this city for twenty-eight years, makes the field for pecan trees a very large one viz. from the Gulf to the forty-first parallel. Tell Dr. Deming we trust his wonderful discovery does not prove to be a pig-nut.

Our opportunities in the north for growing nut trees I think are wonderful.

The association with you will be a great success.

Sincerely,

W. A. THOMAS.

August 23, 1922.

MR. JAMES S. McGLENNON,
Rochester, N. Y.

Dear Sir:—

I wish to thank you for your very kind letter of the eighteenth, and beg to assure you that it would afford me great pleasure to attend and meet you and others who are doing constructive work in the cause of nut culture. Unfortunately it will not be possible for me to do so. I have been on the sick list for the past few weeks which with my eighty-five years has left me so weak that I could not endure the fatigue connected with such an undertaking.

I would much like to see the results of your work with filberts, as I believe that is one branch of nut growing that can be made a success. Some years ago I planted out some filberts and they grew very well and tried to bear nuts. But unfortunately they had been

planted near some woods that contained some squirrels who invariably ate all the nuts before the time they were half grown, so I grubbed them out. Recently I planted some more farther removed from woods and hope to see them fruit soon.

Some years ago I caused some filberts to be planted in ground used by the State Horticultural Society for testing new fruits. These are still living and bearing good crops.

I feel sure you will have a good meeting and am very sorry I can not be with you. Give my best regards to my nut growing friends, to all of whom a cordial invitation is extended to visit me and see what I am doing here with chestnuts.

Truly
E. A. RIEHL.

NEW YORK AGRICULTURAL EXPERIMENT STATION
GENEVA, N. Y.

June 24, 1922.

Dear Dr. Deming:

It is kind indeed of you to ask me to help you out in your coming convention. Were I to be in the country I should be very glad to do anything I could to help out. I am leaving in a few days, however, to spend the summer in Europe and shall not be home at the time of your meeting.

You may be interested in knowing that we are growing some almonds on the Station grounds and that we have been trying to cross them with peaches. We think we have a cross but just what it will amount to I do not know. At any rate, we are living in hopes that sometime we may breed an almond for this part of the world. We are doing something with other nuts but not as much as I should like. We are always hoping that opportunity may offer to do more and possibly we shall be able to within a year or two.

Very truly yours,
U. P. HEDRICK.

The Battle Creek Sanitarium
Battle Creek, Michigan
September 5, 1922.

Mr. James S. McGlennon,
Rochester, New York
Dear Sir:—

Enclose you will find my paper.

I am very sorry, indeed, that I could not be with you, but an unexpected amount of surgical work compelled me to remain at home. I hope you will have a most successful convention. The Nut Growers Association, in my opinion, may prove one of the most important factors in the world movement for race betterment.

Sincerely yours,
JOHN HARVEY KELLOGG.

ATTENDANCE

Dr. Robert T. Morris, N. Y. City, Mr. and Mrs. J. S. McGlennon, Miss Norma McGlennon, Mrs. W. D. Ellwanger, Rochester, N. Y., Mr. and Mrs. W. G. Bixby, Baldwin, N. Y., J. F. Jones, Lancaster, Pa., Mr. and Mrs. J. M. Patterson, Putney, Ga., S. W. Snyder, Center Point, Iowa, Harry R. Weber, Cincinnati, Ohio, John Rick, Reading, Pa., Jas. A. Neilson, Guelph, Canada, Joseph A. Smith, Providence, Utah, Harry D. Whitner, Reading, Pa. Henry D. Spencer, Decatur, Ills. Mr. and Mrs. Samuel L. Smedley, Newtown Square, Pa., Mr. and Mrs. Geo. H. Corsan, Brooklyn, N. Y. Jacob E. Brown, Elmer, N. J. W. R. Fickes, Wooster, Ohio, W. J. Strong, Vineland Station, Ontario, Canada, P. H. O'Connor, Bowie, Maryland, Adelbert Thomson, East Avon, N. Y., A. C. Pomeroy, Lockport, N. Y. F. A. Bartlett, Stamford, Ct., Mr. and Mrs. S. H. Graham, Ithaca, N. Y., E. L. Wyckoff, Aurora, N. Y., M. G. Kains, Suffern, N. Y., Mrs. J. B. Comstock, Hollywood, Cal., Joseph Baker Comstock, III, Hollywood, Cal., Mr. and Mrs. E. A. Hoopes, Pa. John Dunbar, Rochester, N. Y., R. E. Horsey, John P. Lauth, Mr. and Mrs. J. B. Rawnsley, Geo. B. Tucker, Mrs. C. R. Nolan, D D. Culver, M. L. Culver, C. A. Vick, Mrs. K. Dugan, W. J. Nolan, Mr. and Mrs. Fred Garrison, Mr. and Mrs. Clifford Spurr, Miss K. M. Pirrung, Miss Ida Schlegel, Alois Piehler, Miss Robena Murdoch, John Herringler, Mr. and Mrs. Conrad Vollertsen, Elwood D. Haws, Mr. and Mrs. Ralph T. Olcott, Rochester, N. Y.

List of Nuts exhibited before the Northern Nut Growers Association September 7-8-9, 1922 at Rochester, N. Y., by Park Department.

Black Walnut, Juglans nigra, United States.

English Walnut, Juglans Regia, Europe and China.

Western Walnut, Juglans major, Western States.

Hybrid Walnut from Washington, D. C., supposed hybrid between Juglans rupestris and Juglans nigra.

Butternut, Juglans cinerea, North America

Siebold's Butternut, Juglans Sieboldiana, Japan.

Juglans cathayensis, China.

Juglans coarctata, Japan.

Winged Chinese Walnut, Pterocarya stenoptera, China.

Winged Caucasian Walnut, Pterocarya fraxinifolia, West Asia.

King-Nut, Carya laciniosa, United States.

Shagbark, Carya ovata, North America.

Carya ovata ellipsoidalis, United States.

Ash-leaved Hickory, Carya ovata fraxinifolia, United States.

False Shagbark, Carya ovalis, United States.

Small Fruited Hickory, Carya ovalis odorata, North America.

Carya ovalis obovalis, North America
Carya ovalis obcordata, United States.
Pignut, Carya glabra, North America.
Large Pignut, Carya glabra megacarpa, United States.
Bitternut, Carya cordiformis, North America.
Hybrid Hickory, X Carya Laneyi, Carya cordiformis X Carya ovata.
Hybrid Hickory, X Carya Dunbarii, Carya laciniosa X Carya ovata.
Beaked Hazel, Corylus rostrata, North America.
American Hazel, Corylus americana, North America.
European Hazel, Corylus Avellana, Eastern Hemisphere.
Constantinople Hazel, Corylus Colurna, South Europe.
Manchurian Hazel, Corylus mandshurica, Manchuria.
Sweet Chestnut, Castanea dentata, United States.
European Chestnut, Castanea sativa, Europe to China.
Japanese Chestnut, Castanea crenata, Japan, China.
Chinquapin, Castanea pumila, United States.

By the McGlennon-Vollertsen Filbert Nursery, twenty or more plates, of about a quart each, of named varieties of the European filbert grown in these Rochester nurseries, a very striking exhibit in demonstration of the commercial possibilities of this nut. By E. L. Wyckoff, Aurora, N. Y., a cluster of Indiana pecans, grown on a grafted tree at Aurora, of good size, apparently, other qualities not determined. A cluster of two small pecans grown on the great pecan tree in Hartford, Ct. One of these nuts was matured and filled. Brought by W. C. Deming who showed also chinkapins grown in Hartford and Redding, Conn. two strains of the Van Fleet hybrid chinkapins, Chinese chestnuts, C. mollissima, Japanese chestnuts, clusters of Kirtland and Griffin shagbarks from grafted trees, Ridenhauer almonds and several varieties of European and American filberts, all grown in Redding, Ct. filberts from the large trees at Bethel, Ct. and the large Sayre English walnut from Danbury, Ct. Illinois wild almonds were exhibited by Henry D. Spencer of Decatur, Ills. These have a fleshy covering like a thin peach. Mr. P. H. O'Connor showed specimens of the O'Connor hybrid walnut, J. regia X. J. nigra, and the Indiana hazel. Mr. A. C. Pomeroy had an exhibit of the Pomeroy English walnut. There were a number of other exhibits which have escaped record.

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

FOURTEENTH ANNUAL MEETING

WASHINGTON, D. C.

SEPTEMBER 26, 27 and 28, 1923

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

FOURTEENTH ANNUAL MEETING

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SEPTEMBER 26, 27 and 28, 1923

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*Bowditch, James H., 903 Tremont Bldg., Boston
Bowles, Francis T., Barnstable
Cleaver, C. Leroy, Hingham Center
Collins, Geo. D., 388 Union St., Springfield
Johnstone, Edward O., North Carver
Sawyer, James C., Andover
Wright, G. F., Chelmsford

MICHIGAN

Banine, Chester H., Vandalia
Charles, Dr. Elmer, Pontiac
Copland, A. W., 670 E. Woodbridge St., Detroit
Graves, Henry B., 2134 Dime Bank Bldg., Detroit
Kellogg, Dr. J. H., 202 Manchester St., Battle Creek
*Linton, W. S., Saginaw
Penney, Senator Harvey A., 425 So. Jefferson Ave., Saginaw
Wallace, Henry, Detroit

MISSOURI

Crosby, Miss Jessie M., 4241 Harrison St., Kansas City
Stark, P. C., Louisiana
Youkey, J. M., 2519 Monroe Ave., Kansas City

NEBRASKA

Caha, William, Wahoo
Thomas, Dr. W. A., Lincoln

NEW JERSEY

Brown, Jacob S., Elmer, Salem Co.
Clarke, Miss E. A., W. Point Pleasant, Box 57
Franck, M., Box 89, Franklin
Gaty, Theo. E., 50 Morris Ave., Morristown
*Jaques, Lee W., 74 Waverly St., Jersey City
Landmann, Miss M. V. Cranbury, R. D. No. 2
Marston, Edwin S., Florham Park, Box 72
Parry, T. Morrel, Riverton
Ridgeway, C. S., Lumberton

NEW YORK

Abbott, Frederick B., 1211 Tabor Court, Brooklyn
Ashworth, Fred L., Heuvelton
Bennett, Howard S., 851 Joseph Ave., Rochester
Bethea, J. G., 243 Rutgers St., Rochester
Bixby, Willard G., 32 Grand Ave., Baldwin, L. I
Bixby, Mrs. Willard G., 32 Grand Ave., Baldwin
Brinton, Mrs. Willard Cope, 36 So. Central Pk., N. Y. City
Buist, Dr. G. L., 3 Hancock St., Brooklyn
Clark, George H., 131 State St., Rochester

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*Life Member.

Cothran, John C., 104 High St., Lockport
Corsan, G. H., 55 Hanson Place, Brooklyn
Culver, M. L., 238 Milburn St., Rochester
Diprose, Alfred H., 468 Clinton Ave., South, Rochester
Dunbar, John, Dep't. of Parks, Rochester
Ellwanger, Mrs. W. D., 510 East Ave., Rochester
Gager, Dr. C. Stewart, Brooklyn Botanic Garden, Brooklyn
Gaty, Theo. E. Jr., Clermont
Gillett, Dr. Henry W., 140 W. 57th St., New York City
Graham, S. H., R. D. 5, Ithaca
Hart, Frank E., Landing Road, Brighton
Haws, Elwood D., Public Market, Rochester
Henshall, H., 5 W. 125th St., N. Y. C.
Hoag, Henry S., Delhi
Hodgson, Casper W., Yonkers, (World Book Co.)
*Huntington, A. M., 15 W. 81st St., New York City
Jewett, Edmund G., 16 S. Elliott Place, Brooklyn
Johnson, Harriet, M. B., 15th St. & 4th Ave., New York City
Krieg, Fred J., 11 Gladys St., Rochester
Lattin, Dr. H. W., Albion
Lauth, John C., 67 Tyler St., Rochester
Liveright, Frank I., 120 W. 70th St., N. Y. C.
MacDaniel, S. H., Dept. of Pomology, New York State College of Agriculture, Ithaca
McGlennon, J. S., 28 Cutler Building, Rochester
Motondo, Grant F., 198 Monroe Ave., Rochester
Nolan, Mrs. C. R., 47 Dickinson St., Rochester
Nolan, M. J., 47 Dickinson St., Rochester
Olcott, Ralph T. (Editor American Nut Journal), Ellwanger and Barry Building, Rochester
Paterno, Dr. Chas. V., 117 W. 54th St., N. Y. City
Pierce, H. Gordon, 103 Park Ave., N. Y. City
Pirrung, Miss L. M., 779 East Ave., Rochester
Pomeroy, A. C., Lockport
Rawnsley, Mrs. Annie, 242 Linden St., Rochester
Rawnsley, James B., 242 Linden St., Rochester
Schroeder, E. A., 223 East Ave., Rochester
Shutt, Erwin E., 509 Plymouth Ave., Rochester
Snyder, Leroy E., 241 Barrington St., Rochester
Solley, Dr. John B., 968 Lexington Ave., New York City
Teele, Arthur W., 120 Broadway, New York City
Tucker, Arthur R., Chamber of Commerce, Rochester
Tucker, Geo. B., 110 Harvard St., Rochester
Vick, C. A., 142 Harvard St., Rochester
Vollertsen, Conrad, 375 Gregory St., Rochester
Waller, Percy, 284 Court St., Rochester
Wile, M. E., 955 Harvard St., Rochester
Williams, Dr. Chas. Mallory, 4 W. 50th St., New York City
*Wisman, Mrs. F. de R. Westchester, New York City
Wyckoff, E. L., Aurora

NORTH CAROLINA

Hutchings, Miss L. G., Pine Bluff
Matthews, C. D., North Carolina Dept. of Agriculture, Raleigh

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*Life Member.

Van Lindley, J., (J. Van Lindley Nursery Co.), Pomona

OHIO

Beatty, Dr. W. M. L., Route 3, Croton Road, Centerburg
Coon, Charles, Groveport
Dayton, J. H., (Storrs & Harrison), Painesville
Fickes, W. R., Wooster, R. No. 6
Hinnen, Dr. G. A., 1343 Delta Ave., Cincinnati
Neff, Wm. N., Martel
*Weber, Harry R., 123 East 6th St., Cincinnati

OREGON

Frost, Earl C., Route 1, Box 515, Gates Rd., Portland

PENNSYLVANIA

Althouse, C. Scott, 540 Pear St., Reading
Anders, Stanley S., Norristown
Baum, Dr. F. L., Boyertown
Bohn, Dr. H. W., 34 No. 9th St., Reading
Bolton, Charles G., Zieglerville
Boy Scouts of America, Reading
Druckemiller, W. H., 31 N. 4th St., Sunbury
Fritz, Ammon P., 35 E. Franklin St., Ephrata
Gribbel, Mrs. John, Wyncote
Hershey, John W., Ronks
Hess, Elam G., Manheim
Hile, Anthony, Curwensville
Horst, John D., Reading
Jenkins, Charles Francis, Farm Journal, Philadelphia
Jockers, Fred'k J., 4 E. Township Line, Jenkintown
*Jones, J. F., Lancaster, Box 527
Kaufman, M. M., Clarion
Leach, Will, Cornell Building, Scranton
Mellor, Alfred, 152 W. Walnut Lane, Germantown, Philadelphia
Minick, C. G., Ridgway
Paden, Riley W., Enon Valley
Patterson, J. E., 77 North Franklin St., Wilkes Barre
Pratt, Arthur H., Kennett Square
*Rick, John, 438 Penn Square, Reading
Rittenhouse, Dr. J. S., Lorane
Rose, William J., 413 Market St., Harrisburg, "Personal"
Rosenberry, W. H., Box 114, Lansdale
Rush, J. G., West Willow
Smedley, Samuel L., Newton Square, R. F. D. No. 1
Smedley, Mrs. Samuel L., Newtown Sq., R. F. D. No. 1
Smith Dr. J. Russell, Swarthmore
Taylor, Lowndes, West Chester, Box 3, Route 1
Weaver, William S., McCungie
Whitner, Harry D., Reading
Wilhelm, Dr. Edward A., Clarion
*Wister, John C., Clarkson and Wister Sts., Germantown
Wolf, D. D., 527 Vine St., Philadelphia
Zimmerman, Dr. G. A., Piketown

*Life Member.

RHODE ISLAND

Allen, Philip, Providence

SOUTH CAROLINA

Taylor, Thos., 1112 Bull St., Columbia

TENNESSEE

Waite, J. W., Normandy

UTAH

Smith, Joseph A., Edgewood Hall, Providence

VERMONT

Aldrich, A. W., Springfield, R. F. D. No. 3
Ellis, Zenas H., Fair Haven
Holbrook, F. C., Battleboro

VIRGINIA

†Dodge, Harrison H., Mount Vernon
Gould, Katherine Clemons, Boonsboro, Care of C. M. Daniels, via Lynchburg, R. F. D. 4
Harris, D. S., Roselawn, Capital Landing Road, Williamsburg, R. 3
Hopkins, N. S., Dixondale
Jordan, J. H., Bohannon
Moock, Harry C., Roanoke, Route 5

WASHINGTON

Berg, D. H., Nooksack
Turk, Richard H., Washougal

WEST VIRGINIA

Brooks, Fred E., French Creek
Cannaday, Dr. J. E., Charleston, Box 693
Hartzel, B. F., Shepherdstown
Mish, A. F., Inwood

†Honorary Member

CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay three dollars annually, or five dollars, including a year's subscription to the American Nut Journal. Contributing members shall pay ten dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

PROCEEDINGS

AT THE

FOURTEENTH ANNUAL CONVENTION OF THE NORTHERN NUT GROWERS ASSOCIATION

New National Museum, Washington, D. C.

Septemer 26-27-28, 1923.

(In making up this report the transcript of the stenographer's full report has been unsparingly cut, in accordance with the vote of the convention. Copies of the full report are in the possession of the secretary.)

The Convention was called to order at 2 p. m., Sept. 26, 1923, in the New National Museum.

In his opening address the president spoke of the need for increased membership and improved financial condition. He also recommended a return to the old method of combining the secretary and treasurer in one office and that the secretary-treasurer should have a fair salary, suitable quarters, and adequate help. He spoke of his own efforts to increase the usefulness of the association and expressed his fears that they had amounted to very little. He quoted the statement of the editor of the American Nut Journal that what people want to know is whether they can make any money by the cultivation of nut trees. That statement led to a campaign to try to locate in the territory of the association groups of nut trees in profitable bearing. He felt satisfied that there are numerous paying nut orchards, and he recommended a continuance of the campaign for locating such orchards.

The president then went on to instance the experience of Mr. Frederick G. Brown of Salisbury, Mass., at whose place, about two miles from the ocean, there are two Persian walnut trees, 12 to 15 years old, one of them about a foot in diameter and twenty feet high, that have borne for two years. Peach trees will not live at this place.

Two miles away at Newburyport is a tree a year or two younger that bore a half peck of nuts last year, and another tree 35 years old in bearing for 15 or 20 years. The nuts were spoken of as of high quality.

He referred to Edward Selkirk of North East, Pa., who has a grove of 250 trees about 22 years old of the Pomeroy variety. Last year the crop was one ton and brought in a little over $500.00. This year the crop is much larger. For best development of the trees the land should be given over entirely to their culture.

The president quoted a letter from E. A. Riehl of Godfrey, Illinois as follows:

My nut plantings are mostly young, many just coming into bearing, while many others have been top-worked to better varieties, so that money returns are not what they would be had I started out planting improved varieties. Part of my aim was to originate better varieties than we had when I began. In this, I think, I have been fairly successful.

My plantings consist mostly of chestnuts. These have sold readily at 35 to 40 cents per pound wholesale. It is rather a hard matter to give any idea as to profit, except that we gathered 23 pounds from one tree five years after top-working on a tree then about three inches in diameter. In 1920, the net return was $1,172.54, in 1921, $1,019.44, in 1922, which was about a half crop, $1,196.81. All this on land so rough no crop could be grown on it but pasture. This year's crop promises to be a full one.

As to walnuts, we have made no record of single trees. The Thomas, by actual test, gives ten pounds of meat to the bushel, which we sold to dealers last season at $1.00 per pound, and could not nearly supply the demand.

Walnut crop here a failure this season. Only a few Thomas trees have a crop.

If the meeting was after nut harvest, I would send the best chestnut exhibit that has even been shown at any meeting.

H. C. Fletcher of Clarkson, N. Y., was quoted as estimating the nuts produced from two trees each year from 1911 to 1915 as $25 worth. (Presumably these were Persian walnuts, but this was not stated.) In 1916 and 1917 there were about six bushels of nuts, probably $75 worth. In 1918 a market basket full. In 1919 and 1920 about $40 worth, including some trees sold. In 1921 about $50 worth

were produced and in 1922 $60 worth of nuts and $30 worth of trees.

In the president's own filbert nursery at Rochester over 300 pounds of fine nuts were produced for which 30 cents a pound were offered by grocerymen.

Mr. W. R. Mattoon of the Forest Service of the U. S. Dept. of Agriculture spoke as follows:

Two years ago, when the Forest Service was planning to get up a bulletin on growing walnut trees for timber, we found the need to include information on the nuts also. Mr. C. A. Reed and I together prepared a manuscript on growing the walnut tree both for timber and for nuts.

It pays to grow walnuts in small groups and singly, rather than in large blocks, for while they have not proven altogether failures when planted in large quantities they have been disappointing. Many of the trees which we planted as close as 6 x 8 feet several years ago, have not given very satisfactory results because they have not had enough light and air. The black walnut grows singly in the forest, although there may be full stands of other trees around it. Our idea is to recommend planting the black walnut in spots around on the farm, in little inaccessible places and on the hillsides, where the soil is good; for the black walnut requires good soil, and we cannot find that quality in large patches, nor is it usual on slopes of ground. So we must put it here and there on the farm, along the fence rows and in various places, but not in groups. The farmer planting in this way becomes its wood which is used in the most expensive furniture. I believe that mahogany is the only other wood so valuable. On the other side of the world they have the mahogany tree for cabinet use, and here in America we have the black walnut, a cabinet wood that is not surpassed.

The present available publications on this subject are limited but we are referring people who inquire about it to Department of Agriculture Bulletin No. 933, "The Black Walnut, Its Growth and Management." That is midway between a technical and a popular bulletin, and it comprises about the only available publication that we have at the present time on the subject of growing the tree. Farmers' Bulletin No. 1123, "Growing and Planting Hardwood Seedlings on the Farm", deals with the black walnut along with other trees. Another publication is Department of Agriculture Bulletin No. 153, "Forest Planting in the Eastern United States," which considers the black walnut along with the other available trees for planting.

Mr. Olcott: For a small orchard would it be proper to plant 160 to 180 feet apart?

Mr. Mattoon: When planted in that way you would get nut production and at the same time, a timber growth. If pruned you get a good log at the base. The small, ten-foot logs from these trees pay as much as you would get for an 18 foot log of a taller tree. For forestry purposes, pruning is a desirable practice.

The President: But for nut-bearing, what is your opinion?

Mr. Mattoon: I should suppose that you would want your orchard trees to be as low-branched as possible, and with as full foliage as possible.

Mr. Bixby (acting as secretary) then read a paper by H. R. Mosnat of Morgan Park, Illinois in which he spoke of the number of doctors interested in nut growing and the need of all men of that character having a hobby of that kind. He thought that the taxes on many farms might be paid out of the profits of nut trees planted on the farms and along the highways. But these nut trees should not be seedling trees. The apple and the black walnut are said to be the only trees that grow in every state of the Union. Nuts were one of the staple foods of our ancestors. We should not be discouraged if we have not yet found the right nut for the East and the Middle West. We should seek them promptly because of the rate at which nut trees are being converted into logs. By next year, he said, he expected to have 25 varieties of black walnuts in his collection including some hybrids. Machines for cracking black walnuts by power are now practically perfect and one firm in that business has cracked about a million pounds in the last few years and expects to treble or quadruple its business this season if supplies can be secured. The trouble with most walnut cracking machines is that they crush instead of crack and small bits of shell are apt to stick to the meats. But there is machinery now to remove these bits of shell. There are wild black walnuts that run 16 to 18 per cent kernels, though the average is only $12\frac{1}{2}\%$. It is not always the largest nuts that produce the greatest proportionate weight of kernels. The picking and cracking expense with black walnuts is very little greater than with pecans, but the final cleaning to render the meat absolutely free of shells has been very expensive. Cultivated black walnuts will of course give better results, because they have been selected for easy cracking, have kernels that separate readily from the shell, the product is uniform, and the nuts require much less

grading before cracking than the wild black walnuts, where every tree bears nuts differing in size, as in almost every other quality. Figuring 50,000 pounds to the carload it will take about eight carloads of wild black walnuts to make one carload of kernels of the same weight. More and more English walnuts and pecans are being sold in the form of kernels, and black walnuts also will best be sold in kernels. These can be canned in vacuum glass or metal cans, and the housewife will use more nuts when she can get the shell-free meats with her favorite cooking utensil, the can-opener. Confectioners and bakers will take black walnut meats by the carload in preference to other nut meats because they have more flavor, and so "go further."

The growing of black walnuts in a commercial way will require education, but already there is a growing interest. Several of the large weekly publications have, within the last couple of months, carried full page, illustrated articles on black walnuts. One of these, in a magazine of general circulation which is over half a million, within a month resulted in almost one hundred letters asking for additional information, which shows that a great many people want to know more about the possibilities of black walnuts. This interest will certainly increase when profitable black walnut orchards are actually growing and paying good profits. Already men are putting in black walnut orchards or groves of several hundred acres, and one such planting of 1,600 acres is proposed, but it will be partly hardy pecans. This shows rapid development into a real industry of magnitude.

Report of the Secretary.

On March 1, 1923, the treasurer, Mr. W. G. Bixby, handed over to the secretary the funds and books of the association, saying that his time had become so much taken up that he was able to give too little of it to the duties of his office. Thus it became necessary for the secretary to assume the functions of the treasurer as well.

These functions were, in the first place, the payment of the obligations of the association from the funds available. The funds available for current expenses were not sufficient for the payment of these obligations. The secretary therefore took it upon himself to pay these obligations with funds of the association put aside for other purposes. These funds were money received from life membership payments that had been deposited in the Litchfield Savings Society, as a sort

of contingent fund, and other funds from the same source held by the treasurer and handed over by him to the secretary. These two funds were completely used up in the payment of current expenses, as will appear in the detailed statement of the secretary.

These funds, however, were still insufficient to pay the current expenses, which were, chiefly, the expenses of the stenographer's report and transcripts of the thirteenth annual convention, at Rochester, and the cost of printing the annual report. The cost of printing the report was paid out of the available funds. The stenographer's bill, amounting to $169.00 originally, but reduced to $135.00 by the stenographer on representation by the officers of the association that the amount was excessive, was paid by Mr. Bixby personally, and the association is indebted to Mr. Bixby in that amount at this moment.

The second function that developed upon the secretary was the management of the membership lists and matters relating thereto, which, though perhaps essentially a duty of the secretary of an association such as this, had been managed by the treasurer since the time when he took over the duties of the secretary in 1918. This had involved quite an expenditure for clerical work. This clerical work would still be an expense to the association, had not one of our members, Mr. H. J. Hilliard, of Sound View, Connecticut, volunteered to do it. Mr. Hilliard was formerly connected with a bank, is entirely familiar with the keeping of accounts, is a man of means and leisure, and I shall take pleasure in offering his name to fill the vacant treasurership. Heretofore, this association has had to pay little or nothing for clerical work which has been done either by the secretary, or by the treasurer and his personal clerical force.

In accordance with the vote of the Rochester convention the secretary drafted two letters, one entitled, "To the State Vice-Presidents of the N. N. G. A. and All Members of the Association"; the other, "To All Women Members of the N. N. G. A. and to All Women Interested, or Interestable, in Nut Culture." Both of these letters were sent to all members of the association, and the letter to women was sent also to a considerable list of women not members. The results of these letters were, so far as the secretary has means of knowing, not over a half dozen letters of appreciation from members, one new woman member, and a letter of appreciation from another woman.

The secretary has reason to believe, however, that the letters were the means of stimulating several of the state vice-presidents to activity

in the matter of getting new members, in writing articles for the press and in giving illustrated talks on nut growing. Among those who are known to have given such talks or articles, are Dr. Morris, Mr. Weber, Mr. Spencer, Mr. Smith, Mr. Turk, Mr. O'Connor, Mr. and Mrs. Corsan, Mr. Reed, Mr. Neilson, Wilkinson, Snyder, Matthews, Kains, MacDaniels, Fagan, Kaufman, Rick, Bixby, the secretary, and, doubtless, a number of others.

The secretary has a collection of slides on nut growing which he has lent two or three times to members for illustrating their lectures. It was necessary to provide a box for the safe transportation of these slides which the secretary purchased, at a cost to the association of $8.85. The secretary also furnished a typed, running commentary for these slides and, in one or two instances, has furnished negatives and photographs for making slides and illustrations. The secretary also offers to furnish outlines for lectures or articles, and has a small collection of nuts which is available for lectures.

If the funds were available, it would be possible to enlarge the collections of slides, illustrations and nuts for the use of members who wished to give talks or write articles.

Possibly the suggestion of the secretary was responsible for the formation of a subsidiary association in Rochester. On this a report is desirable from President McGlennon or Mr. Olcott. One or two other members have written of their intention to form subsidiary associations.

A leaflet was also issued by the secretary announcing Mr. Jones' offer to give seedling nut trees as a premium to new members. The demand for these trees not being up to expectation, Mr. Jones very generously sent out five such trees in place of the original offer of one or two. I hope that Mr. Jones will make a report of the number of trees thus distributed. Although the circular distinctly stated that these trees were premiums for new members, many members understood it as an offer for renewal of membership as well, and I think that in every such instance, Mr. Jones himself forgot and sent the trees. A few members, whose names came in too late, were disappointed in not getting trees. Mr. Jones has intimated that it may be possible to correct these omissions this fall. I hope that Mr. Jones will make a statement about this, and I hope also, that the association will not overlook Mr. Jones' liberality in distributing these trees entirely at his own expense.

There have been expressions of regret, and I am sure that many

more have felt it, that it has not been possible to go on with the nut contests and the giving of prizes for new and valuable nuts. As there is not likely to be any one else willing to assume the really immense labor involved in the nut contests, conducted as Mr. Bixby has conducted them, I suppose that all we can do is to hope that circumstances will sometime again make it possible for Mr. Bixby to resume these very valuable services for the development of nut culture in the United States. I say intentionally "the United States," because I believe that these services have benefitted the whole country. This fact makes me the bolder in uttering the daring suggestion that perhaps, now that Mr. Bixby has shown the way, and developed exact methods that may be safely followed, which, if I do not misapprehend, is what it states that it desires before presuming to take up any new line of work, the Department of Agriculture itself might consider it a matter worthy of its attention. Professor J. A. Neilson, of the less cautious Canadian Department of Agriculture, is rendering very valuable services of this kind for the Dominion of Canada.

There is evidence that several more state agricultural institutions are giving attention to nut growing. (MacDaniels, at Ithaca; J. C. Christensen, University of Michigan).

There is no need of taking your time now to recapitulate the many things that ought to be done to promote the planting of nut trees and the scientific investigation of nut growing. Dean Watt's address, published in the 12th annual report, and the letter of the secretary to state vice-presidents, contain outlines for these things. The attention of the present convention is more particularly to be given to advocating nut tree planting on a production basis.

Regarding the campaign for new members, perhaps the chairman of the committee on membership will make some remarks. The present membership of the association is 337, if we drop no names this year for nonpayment of dues. Of course, those who do not pay their dues should be dropped. But the association has never made any ruling as to how long names should be carried on the rolls. The secretary has been easy in sending copies of the annual reports to members in arrears, hoping that the conscience-stricken recipients would hasten to pay up. But there is no proof that such has been the case, and the secretary would recommend making a rule as to when a member is no longer in good standing, when he should be dropped from the rolls, and what members are entitled to copies of the annual report. The secretary would make the suggestion that there be an amendment

to the by-laws to the effect that members who have not paid their dues within three months from the time of their first notification, be sent a second notification to the effect that they are not in good standing on account of non-payment of dues and are not entitled to receive a copy of the annual report; but that all privileges may be restored on payment of dues. At the end of three months from the sending of the second notice, the names of members not in good standing should be dropped. The annual report should be sent only to members in good standing.

Mr. Hilliard asked me what our fiscal year was. I answered that I did not think we had any. It would undoubtedly be a convenience if we are to have a bank man for a treasurer, and a ruling by the association would be in place.

Our accredited list of nut nurserymen is out of date and a new list should be issued. Recommendations as to changes in or additions to that list, should be considered by the members.

It is desirable that the annual reports of the association should be indexed and bound, but no hand has yet been found to do it.

Our ambitions have so far outstripped our sources of revenue that we have come to look on an annual deficit as a normal and defensible thing. I think it is indefensible. I think it is going to have a bad effect on our attendance and our morals if the members have to look forward to what amounts to a good big assessment at every convention. A deficit is not inevitable. The secretary-treasurer was able to report a surplus at the first, fourth, fifth, sixth and seventh meetings. The income from membership dues should be enough to enable the printing of the annual report. But if not I should be in favor of not printing the report until funds were on hand to pay for it.

In rendering an account of the funds of the association I will first state that there is on hand, cash in bank, $84.89. This amount must be charged with the Bowditch hickory prize fund, $25, which leaves $59.89, cash on hand. We owe Mr. Bixby for paying the stenographer's bill, $135.00, and Mr. Olcott for printing, $24.58, a total of $159.58. This makes our deficit $99.69, practically just one hundred dollars.

It should be recalled that in arriving at this result it was necessary to use up our reserve fund from life memberships, amounting to $225.00 If we count that in with the deficit, it amounts to $325.00.

A detailed account of receipts and expenditures is herewith submitted. At the present moment, on account of a rush of other work,

on account of difficulties of other kinds, and because of a division of the work between Mr. Hilliard and myself, I am unable to give the exact amount received from memberships and sale of reports and bulletins. This I hope to correct before the annual report goes to press.

RECEIPTS

Turned over by the Treasurer, Mar. 1, 1923:	
Money for current expenses	$ 89.66
From life memberships	95.00
Bowditch hickory prize	25.00
From Litchfield Savings Society	130.00
Membership dues	
Sale of reports and bulletins	

EXPENDITURES

Printing report	$378.00
Misc. printing and postals	7.50
Clerical hire and postage	47.65
Postage, telegrams, carriage	38.09
Box for lantern slides	8.85
	$480.09
Due Mr. Bixby, stenographer's bill	$135.00
Due Mr. Olcott, printing	24.00
	$159.58

The report of the secretary was adopted.

The following paper was read by the acting secretary as Mr. Neilson was unable to be present:

SOME FURTHER NOTES ON NUT CULTURE IN CANADA.

Jas. A. Neilson, B. S. A., M. S., Extension Horticulturist, Hort. Expt. Station, Vineland Sta., Ont.

The nut culture activities outlined in the paper presented by the writer at the convention in Rochester were carried on as much as time and means would permit during the past year. The search for nut trees has been continued and has yielded some interesting results. Several valuable trees of kinds already noted have been located and additional species discovered. Among these were five pecan trees which have been growing on the farm of C. R. James at Richmond

Hill, a small town fifteen miles north of Toronto. These trees were about fifty years old and appeared to be perfectly hardy, as far as growth was concerned, but owing to the northern location (43.45″) seldom produced ripened nuts. The season of 1919, however, was longer and somewhat warmer than most seasons, and a fully ripened crop of nuts was gathered. The nuts are small with a thin shell and a fine sweet kernel. The largest tree in the lot is about 35 feet tall with a trunk diameter of 16″ and a spread of branches equal to its height. Another small plantation of pecans was found at Niagara-on-the-Lake on the fruit farm of John Morgan. Some of these trees were of grafted sorts and others were seedlings. Both grafted and seedling trees were making a good growth and appeared to be perfectly healthy.

In as much as the pecan is native to a country having a longer growing season and higher average summer temperatures than southern Ontario, it is quite encouraging to find that these trees will even grow here, to say nothing of bearing nuts. This would seem to indicate that there are possibilities for some of the pecan-bitternut and pecan-shagbark hybrids in southern Ontario where the shagbark and the bitternut grow quite freely.

I also located two excellent shagbark hickories which have fair-sized nuts with thin shell and fine kernels. One of these trees grows about twelve miles west of Simcoe, Ontario, and produces quite a large nut with a shell so thin that it can be easily cracked with the teeth. This particular tree is about seventy feet tall and bore ten bushels of nuts in one season. I have records of several other good hickories and plan to inspect these at the earliest opportunity.

Several more good English walnuts have been located and examined. Among these there is one tree over seventy-five years old which at one time bore thirty bushels of ripe nuts.

A few good heartnut trees have been located at various points. One of these trees is about thirty-five feet tall, with a spread of nearly sixty feet from tip to tip of branches. The present owner harvested several bushels of good nuts in one season from this tree.

I bought with my own funds a bushel of nuts from this tree and sent them in lots ranging from six to thirty to interested parties in various parts of Ontario. Of course I know that this is not in accordance with the best nut cultural principals, but I thought it was one way of getting nut trees started. If these nuts do not reproduce true to type, they will serve as a good stock for budding or grafting

with the best introduced heartnuts later on. Another good heartnut was located almost on the outskirts of Toronto. At five years from planting this tree bore one-half bushel of fine, thin-shelled nuts.

In my last paper I stated that filberts had not done well in Ontario. I am glad to state that I will now have to retract that statement and inform you that good filbert trees have been found near Ancaster, which is close to Hamilton. These trees were about fifty years old, the largest specimen being nearly a foot in diameter at the base and about 25 feet tall. The trees bore well, but on account of the hordes of black and grey squirrels very few nuts were harvested. A fine lot of filberts was also found at Tyroconnell, a small hamlet on the north shore of Lake Erie, in Elgin County. These trees are nearly fifty years old and bear excellent nuts. Much to my surprise I found a fine clump of filberts growing quite near the campus of the O. A. C. at Guelph. These trees were introduced from England about sixteen years ago and at first they did not appear to be hardy, but eventually they established themselves and are now doing well in growth and fruitfulness. I was somewhat amused to think that I was searching so diligently for valuable nut trees all over the Province and did not even know of the existence of these trees, until a year and a half after I made my initial attempt to discover valuable nut trees.

I will have to correct another statement made at the last meeting, to the effect that almonds do not grow well in Canada except on Vancouver Island. Since then I have found a few, good, hard-shelled almond trees growing and yielding well in the Lake Erie country. This leads me to believe that almonds can be grown, with reasonable success, anywhere in the peach belt, particularly in the lake district.

In addition to my efforts to locate good trees I persuaded the authorities at the O. A. C. to establish small plantings of some of the best black walnuts, hickories, Japanese walnuts, and Chinese chestnuts. I also obtained about five bushels of Chinese walnuts and one bushel of Chinese chestnuts from northwest China for testing at the experiment stations, and by other interested individuals. Owing to the length of time the nuts were in transit the majority of them were unfit for germination. A few have grown, however, and we hope to get good results from these.

A collection of nuts containing 60 plates and 21 different species was prepared and exhibited at the Royal Winter Fair at Toronto and also at the Livestock Show at Guelph. I was in attendance almost constantly at Toronto, and endeavored to give all the information

possible on nut culture. Both exhibits attracted a great deal of attention and called forth favorable comments from visitors and the press.

Experimental plantings of English, Japanese, Chinese, and American walnuts, filberts and hickories, have been established at the Horticultural Experiment Station. Mr. W. J. Strong pollenated about 200 black walnut blossoms with pollen of the English walnut. Apparently a good number (approximately 75%) have set fruit.

A graduate of the Ontario Agricultural College, who has become interested in nut culture, procured 2,000 black walnut seedlings from the Forestry Station at St. Williams. These trees were budded, in August last, with local grown English walnuts, but unfortunately only a few buds took. An attempt will be made next spring to whip graft the trees that did not set buds this summer.

There is a marked increase in the interest in nut culture shown by the public during the past year. This is shown by numerous requests for information and addresses on nut growing and by the public endorsement of nut culture by three important horticultural organizations. The Ontario Horticultural Council, the Federal Horticultural Council and the Ontario Horticultural Societies Convention each passed a resolution asking the Dominion Department of Agriculture to appoint a man to investigate the possibilities of nut culture in Canada. No definite action has been taken as yet, but it is expected that an appointment will be made in the near future.

We are giving the boys and girls of Ontario an opportunity to assist us in our work by hunting for good nut trees, and as an incentive we have offered prizes of $5.00 each for the best specimens of our various native and introduced nut trees. This should bring results, because if there is anyone in this wide world who knows where good nuts are, it is the small boy.

The work during the past year has generally been encouraging, but like every other line of human endeavor there have been disappointments. For example, one bushel of Chinese walnuts was stolen, and a number of good specimens of other kinds mysteriously disappeared from my exhibition collection.

Another disappointing feature has been the apathy, and even hostility, shown by some officials. I do not intend, however, to let these difficulties discourage me in the least, but plan to carry on and preach the gospel of beauty and utility as exemplified in our best nut trees.

ADDRESS BY DR. L. C. CORBETT

U. S. Department of Agriculture.

The work in nut culture by the Department of Agriculture antedates the present Bureau of Plant Industry, and to confine the history of the work to the present Bureau of Plant Industry would not quite do the subject justice.

From the time of the beginning of fruit work in the Department of Agriculture, in 1885, nuts have received more or less attention. After the formation of the Bureau of Plant Industry, in 1901, special appropriations were received from Congress for the support of nut investigations, and individuals were appointed to that service in the department. Mr. C. A. Reed, whom you all know very well, was the first appointee of this service, devoting his whole time and attention to the work. He has been with the department for several years, and has given his time exclusively to the nut problems of the country. Naturally, the nut problems are not confined to any geographic area, but are nation-wide; but certain of the plants which have entered into the problems of nut culture have demanded more attention than others, for reasons that are the same as in fruit culture. The older fruits, those better known and longer in cultivation, whose problems are better understood, require less attention from the grower and from the experimenter than do the newer ones in the field.

Nut culture in America, as I understand it, not being a nut culturist myself, consists of two types of projects. We have one type that has long been practiced by man, that we imported from European countries and established on this continent. People have cultivated these nuts more or less intensively for generations, and may of the problems have been worked out, so far as Europe is concerned. Of course, when introduced in America, new problems confronted the growers here. The other type of nut industry is based upon indigenous nuts of which we know little, either from the orchard standpoint or as to the varieties concerned. Our native nuts, particularly the pecan, have forced themselves upon the attention of investigators of the department to much greater extent, perhaps, than any other nut with which we have to deal. Being a native, indigenous plant, not yet under cultivation, there is immediately presented the problem of the choice of varieties, adaption to changed conditions, and all of the problems arising in connection with a rapidly developing commer-

cial industry; certain enthusiasts soon become enamored with the possibilities in the southern parts of the United States for pecan culture, and they immediately transplant it into new and untried regions, and as a result their problems have become legion.

The work of the Department of Agriculture in nut culture has developed really around the growing industries of the country; primarily, around the pecan, and secondly, around the almond and the walnut, for these are the more important, commercially. Naturally, the most pressing problems arise in connection with growing industries; they have growing pains which have to be eased the same as with small boys.

The Department of Agriculture has therefore found itself in the position of seeking answers to numerous questions which have been made in connection with these developing industries. I believe that we have contributed very materially to the knowledge of varieties, particularly as regards their adaptation to different geographic locations. We have also assisted the industries to solve some of their problems of cultivation, particularly of propagation, and also the problems growing out of the maintenance of soil fertility. With a new crop, in a new environment, it is always a problem to know how to manage the soil, and this is one of the leading lines of activity in the field, at the present time. In the Bureau of Plant Industry, two offices, that of Horticulture and Pomology and that of Soil Fertility, are co-operating in the solution of the soil fertility problems in the pecan regions.

Of course, as the industry developed and became established, the natural enemies of the pecan and of the other nut trees asserted themselves, as a result of which there have been set up investigations in the Bureau of Plant Industry to study the life histories of the various fungi that attack pecans; and outside of the Bureau of Plant Industry, the Bureau of Entomology has been devoting time to the study of the control of insect enemies. So that, at the present, the department is so organized that three or four important lines of attack are being made upon problems of these industries. Thus, while at the beginning of the Bureau of Plant Industry, in 1901, there was no single, individual person devoting his time and attention to the problems of nut culture, at present there are quite a group of individuals giving their whole time. I feel we are making progress in the work, and while we may be lagging very much behind what we should like to do, we are assisting as best we can, and are at least keeping in sight of the industry, as it goes forward.

I will not try to go into details about the work we are carrying on, because it is better to tell of what we have accomplishd than to tell what we hope to do. We have a man on the Pacific Coast giving his whole time and attention to the study of breeding and of the cultural problems of almonds. Besides this, we have two men giving all of their time to pecans; and during the last year, there has been established near Albany, Georgia, a station devoted to the cultural problems of pecans. One gentleman is continuously on the ground with the work, and two others devote more or less of their time to it.

Now, while these problems connected with the industries are the ones occupying most attention, the workers in the Department of Agriculture have not been unmindful of other native nut-bearing plants, such as the native black walnuts, the hickories and the chestnut up to the time of the very destructive attack of blight. The chestnut, however, has not passed out of our sphere of activity, because at the present time, (and I think you will see tomorrow at the Bell Station, some interesting possibilities in the future of chestnut culture in this country), the Chinese forms, which are much more resistant to blight, bid fair to give us a progeny to make it possible for us also to have a chestnut industry from the horticultural standpoint.

Probably the day of timber supply from our native chestnut is at an end. We hope not, but it looks that way at the present time. The possibilities of growing trees from China, the mollissima, or hybrids of them, bids fair to place the chestnut industry so that we can contend with the blight. We probably will not have immune varieties, but those which are able to live with the blight. That, it seems to me, is a very important consideration, because chestnuts have always been an important nut in our eastern markets, and are important in the European markets as well. While the larger forms of southern Europe will probably not be of value to us here, if we can establish a nut industry with nuts of fair quality, as large as our native sweet chestnuts, based on the Chinese species, the mollissima, then we will be making progress. You may see some of these trees at Bell Station which are eight or ten years old; they are bearing quite abundantly, and some of the chestnuts are really very palatable and of satisfactory size.

In addition to this breeding work with chestnuts, there is under way intensive breeding work with almonds which has for its object the development of those more hardy than those now in cultivation in California. This almond industry, though large, is handicapped be-

cause of the late frost injury, and it is desirable to get those which will bloom later and withstand lower temperatures.

The varietal problem with pecans will be ever with us, as long as varieties are found in the wilds and as long as people continue to plant seedlings in different localities. That is one of the subjects that is being given considerable attention.

In addition, the relative productivity of the plants to use as mother plants is an important one. In the work of the Department of Agriculture in connection with citrus fruits, it has been found that the individual bud carries over into its progeny the ability to produce fruit not only of a given type, but also the productivity of the parent to the progeny. A long series of records of the behavior of individual trees have been secured; we are building up a mass of information on which to base selections for better parent trees than any available at the present time. If the pecan behaves like the citrus fruits of California, we will be able in the future to have strains and varieties which will be very much less variable than those at the present time.

The propagation, selection, disease and cultural work covers the field that is handled by the Bureau of Plant Industry. We always like to dream of the future, and we are pleased to have the dreams come true. We must have in mind the possibility of better black walnuts than we have at present; and after the great inroad into the industry made at the time of the War, when the trees were used for timber puposes, there should be a greater effort on the part of the people in the northern districts to propagate black walnuts, not only for nuts but also for timber. The black walnut is a very great asset not only for timber and for ammunition purposes, but for food as well.

The hickory tree is in the same class as the black walnut—it is a valuable timber tree as well as nut tree. No other timber is as valuable for the construction of wheels as hickory, and while the "disc wheel" has served a useful purpose in railroad car construction, it is not likely that it will replace hickory altogether in the construction of wheels of motor vehicles. We are veritably a nation on wheels and we will always be looking for material with which to carry us through the country. As I have said, we are a nation of people on wheels, and if your propaganda did nothing more than to stimulate an increased interest in the production of hickory for timber purposes, it would be accomplishing a great result. But I believe that there are varieties among the hickories which should be to the North what the pecan is to the South. There are those which are very large and

those which are thin-shelled, and those of fine flavor; as a food product I think the shellbark is second only to the pecan. And I should hail the day with great interest when there are good, recognized varieties of hickories corresponding with the best varieties of pecans. I believe they will be found and developed.

I have told you something of what we are doing and of what we hope may result. I hope that you will all visit the offices of the Department carrying on this work, and that you will get acquainted with the men handling the various projects, and tell them what your troubles are, that they may know how to proceed, and that they may discuss with you the best ways of attacking and handling the problems with which you are confronted.

Prof. Lumsden of the Federal Horticultural Board spoke of the chestnut bark disease and the fact that our experts advise us that within the period of twenty-five years the destruction of the native American chestnut will have been accomplished. The tanners and related interests of the country are now scouting around to find some species of tree to use as a substitute for tanning operations. Castanea mollissima is capable of developing into a good sized tree. From an economic standpoint the texture of its lumber is good, while the quality of its fruit is fair, and as an ornamental tree it has a future. It has resistance to the chestnut bark disease. It may become a substitute for C. dentata. Several crosses have been made between C. dentata and C. mollissima and some of them show considerable merit. Selection of these hybrids will have to be made for two purposes, namely wood production and fruit production.

Corylus colurna, the Constantinople filbert, is destined to become popular as an ornamental. On the Pacific Coast a bacterial blight occurs in some sections on corylus. A great work can be done in this country by the Northern Nut Growers Association by publishing bulletins advocating plantings of nut bearing trees for a three-fold purpose, timber, food, and beauty.

Communications were read from Miss Frances L. Stearns, Instructor in Botany of the Grand Rapids (Mich.) Junior Colony, asking information about planting nut trees, and from Mr. J. A. Young, Secretary of the Tree Lovers Association of America, asking the association to adopt their slogan and to co-operate with it in urging the more intelligent planting of trees, shrubs and flowers.

The evening session on Sept. 26th was called to order at 8:10 and a moving picture reel, "The Almond Industry in California," loaned by the Dept. of the Interior, was shown. Following that an address with lantern slides was given by Mr. C. A. Reed of the Dept. of Agriculture, on his recent trip to China.

Mr. Reed: In 1910 certain Americans in China conceived the idea of exporting the walnuts produced in that country to America. The experiment proved so successful that they continued to do so, and shipped their walnuts to this country year after year. The business built up very rapidly, until the war broke out when, for the time being, the industry was forced to a standstill. But as soon as the war was over the business picked up again, and had assumed such proportions, about two years ago, that American growers wanted to know how much longer the Chinese would be able to send walnuts over here. Most of the nuts from China were of inferior quality to those produced in this country. Records of the exports showed that there had been an increase from China each year; but as to the methods used, the extent of orcharding, or the growth in planting, etc., the matter had not been written up, and the consuls had not the remotest idea. It was finally decided by Congress, therefore, that a special appropriation for an investigation should be made. So a special trip was made to China to ascertain, first of all, the probable trade from there for the next ten or twenty years. Our people felt that more walnuts would be coming here, and they wanted to know about this before they planted any more here. It fell to my lot to make the trip, a year ago this summer.

We went first to Honolulu; then to Manila and Japan, and finally to China. We went into the section just to the right of Tientsin. By superimposing a map of China over that of the United States you may see that China more than covers this country; China is considerably larger than the United States.

Our basic point was Peking, which is in about the same latitude as Philadelphia. We found that walnuts were grown all through this section of China, not very much farther north than Peking, but not much farther south than Shanghai. There are walnuts cultivated here, in the Chinese way, over a great area; but we were convinced that the exportation of walnuts to this country was not likely to increase, for the business has apparently reached its height. American trade takes the best nuts; the second best go to Canada, the third to Europe and the fourth and fifth to Australia.

Our first expedition into the country was almost directly north of Peking. We went down the railroad about 15 miles, to Shaho, where we employed donkeys and a ricksha, and rode across country some 12 or 15 miles. Here we found a very excellent Chinese hotel, and surrounding orchards of perhaps 300 trees. Some of the consular reports in China stated that this place was one of the three sections in which the finest shipments of nuts were produced.

We next went to the east of Tientsin where we found quite a number of orchards and trees claimed to be from 150 to 200 years of age, although we found, after travelling a short time and inquiring from the Chinese farmers, that the figures they gave to us were probably inaccurate. We finally ceased to ask the Chinese farmers for figures of that sort. It was very interesting to note the difference in Chinese and American methods. For instance, in China, the land may be owned by one or by several people, who will lease the land or the trees, or perhaps even an individual tree, for a period of years. White marks placed on the trees indicate their ownership.

Young walnut trees were very scarce. We were told in one province that Chinese merchants, who had been forced out of Russia because of economic conditions there, and had lost everything, had come home and were seeking something with which to make money. They were already planting a considerable number of walnut trees, and were growing crops under the trees, planting crops of millet first, and then of soy beans later in the season. Another crop they use is called kaolin (pronounced "gollin" in this country).

Very few of the trees are ever pruned systematically, or taken care of; the Chinese seem to have no idea of this. Of course, the rainfall there is at a different time of the year than ours. Fall, winter and spring, in North China, are practically without rain. Consequently, the atmosphere is very dry.

Here and there we found trees that struck us so favorably that we made notes with the intention of going back to the trees to get scions for propagating purposes for this country. We were told that one of these trees had borne 800 pounds of nuts. I suppose, however, if that was so, it was green weight, and included the hulls. This tree was on the grounds of the Y. M. C. A., about 80 miles below Shanghai, the farthest south we went. The tree had been planted by missionaries, and had made splendid growth. There were not many walnuts south of that point, however. In the province of Shanshi the soil is of a washed nature, subjected to rains, and we found there huge

gorges that had evidently been forming for centuries. All of the soil there, that is not too uneven to be cultivated, is terraced; and along the sides of the terraces walnut trees are planted. We usually found tunnels along the sides of the terraces. These were dug around the bank so that the water would run through the tunnels instead of over the terrace.

We saw no indications of blight. We thought we saw it in one case, but when we examined the nuts, it proved to be nothing but insects working on the hulls.

Wherever we went, we were told by the Chinese that they harvest their walnuts at about the time of the year which in America would be about the first week in September. We found, however, that the nuts were off of the trees and assembled on the ground for sorting and drying, long before that. They were put in windrows covered with millet straw and left for ten days, after which time the hulls were chipped off with knives and the nuts immediately washed and put on the market. I was particularly struck with the mechanical motion with which the Chinese men worked; it was just as regular as a machine. This was the first time that characteristic came to my attention, and afterwards I was struck with the same thing everywhere.

Each farmer takes his products, whatever they may be, to a common town called "market town," and there they are bought by the local merchants, or the "compradors." The exporters are missionaries and foreigners who make no effort to buy from the farmers, for the tradesman, or comprador, can get the nuts at a better figure than can the foreigners. The tradesman gets his commission in addition. The baskets of nuts are carried on poles placed over the shoulders of the Chinese.

On of the principal walnut centers of Chantung Province is 25 miles from the railroad, and we made quite an effort to reach it. An agricultural missionary, a Mr. Gordan, made the trip there with me, and we found it a badly infested section. We arrived about three o'clock in the afternoon and took about one hour going around to see the nuts. There were places within the wall where nuts had been assembled, and we made estimates as to the number of pounds. I think there were from 100 to 150 sacks of nuts in a pile.

Many of the women and children grow walnuts and these crops are inspected and sorted before being shipped to Peking. In the early summer, we saw quantities of apricot kernels being transported

to the market and sold as almonds. We had understood that China was quite an important almond-producing country, but I doubt if there are any almonds in China. I did not see a tree, nor did I get an indication that there were any there.

One of the largest chestnut trees that I saw measured eight feet and would have been valuable for timber purposes. It was in one of the very attractive little orchards of chestnut trees in the north of Shansi and northeast of Tientsin. We understood that there were very large orchards to the north, but you might say that there is no such thing as a large orchard in China. We counted about 100 trees in such orchards, and we made notes as to their bearing habits. We found the chestnuts of pleasing quality, of a fair size, and not quite as large as European nuts but larger than the American. We did not see many of the trees which had been allowed to develop normally. They are not of special value in China, and consequently, the branches are removed as high as possible, and often the tops are cut out.

The Chinese have a species of native peanut which is very shrivelled and hard; but missionaries from this country have introduced there the American peanut, which is now grown so extensively that Chinese exports have disturbed our market conditions considerably.

The Chinese allow nothing to go to waste. When the peanuts are removed from the ground and cared for, the soil is sifted so that no peanuts will be lost. The American peanut grown there is served in little butterdishes on the hotel tables, as a delicacy.

THURSDAY MORNING SESSION, SEPTEMBER 27

Meeting called to order by President McGlennon, 10:15 a. m.

The president appointed as Nominating Committee to nominate officers for the ensuing year, Dr. Robert T. Morris, Prof. C. P. Close, J. S. McGlennon.

Mr. T. P. Littlepage, of Washington, D. C., then spoke on the subject of Commercial Nut Culture.

This is a very difficult subject to discuss, for the reason that, as yet, there are very few facts upon which to base any conclusions about commercial nut culture in the North.

First, let me say that the principal point upon which we base our opinion that nut culture in the North has commercial possibilities, is the fact that growing throughout many sections of the North are

thousands of nut trees, pecans, walnuts, hickories and butternuts, many of which grow very fine nuts. It would be a repudiation of all known laws of natural science to conclude that trees budded and grafted from these desirable parents would not grow and bear the same as they do. Therefore, we are perfectly safe in concluding that if there are successful nut trees growing, others also will grow. Let us proceed to consider some of the requirements.

First, there is the soil requirement. But before considering the soil requirement, I might add that we must keep within reasonable latitude of the homes of the native trees. This subject has been fully covered in previous reports of our association, and I do not care to go into a detailed discussion of it, except to say that prospective planters of commercial orchards should read the previous reports of the association on this subject, and keep in mind that somewhere north of the home of the parent trees, is a line north of which these trees will not bear. This line is dependent upon several things, altitude, topography and other elements. As an example, I merely mention that orange orchards flourish in California at the Philadelphia latitude.

Going on with the question of soil, upon this subject alone might be written a whole volume. But a few points are essential. Most nut trees require a deep, well-drained soil that is not swampy or seepy, and over which there are no overflows during the summer season. Pecans grow along the river bottoms where there are heavy overflows in the winter, but such an overflow in the summer would probably kill the trees. Nut trees seem to flourish well on land that is underlaid with clay as a subsoil. In fact, almost any kind of good farm land is suitable for some of the different kinds of nut trees, provided it does not come within the restrictions above mentioned. The better the land, however, the more successful will be the growth of the trees, and I very much doubt whether it pays to put any kind of desirable tree on undesirable land. I have heard it said of pedigreed stock that about ninety percent of the pedigree is in the corn crib, five percent in the man that does the feeding, and five percent in the blood. Perhaps these percentages might be subject to some variations. I shouldn't reduce the corn crib requirement, and I think about ninety percent of the success of our nut trees will depend upon the land.

The next point to be considered is the question of varieties and, in this connection, it is essential to remember that nuts are produced to be sold and eaten; therefore, it is important to keep in mind the

requirements of the consuming public. Upon this question also have been written many thousands of pages which, when all summed up, simply amounts to this: get the best varieties that will bear in your particular locality. This can be determined to some extent by what native trees are growing in your particular locality, although not entirely so. In many sections of the country, there are no native pecan trees, and yet these trees flourish very successfully when brought from some other section. On this point the prospective planter of commercial orchards should seek the best advice obtainable.

The third requirement for a commercial nut orchard is cultivation and attention. Many of the nut trees will grow and bear without any attention whatsoever, but they will take your time for it. I have seen wild pecan trees that were not over twelve or fifteen feet high at twenty-five years of age. I have seen cultivated trees larger than that at eight years of age. A tree responds to care and cultivation the same as corn or potatoes or any other of the cultivated crops. The lack of cultivation is just as detrimental to them as to these crops. Young pecan trees should be hoed five or six times each summer, and when they get to be four to seven years of age, there ought to be a constant, clean cultivation, from early spring until late in the summer, followed by a good cover crop to be turned under the following spring at the beginning of the cultivating period. They should also be given plenty of good, commercial fertilizer.

If the prospective planter of commercial nut orchard has enough faith and hope and follows the suggestions given above, he will not be dependent upon charity in his old age.

Dr. Jordan: I am interested as an amateur pecan grower, and I would like to ask what varieties will be of most profit, commercially, that can be grown with a reasonable hope of success in the northern latitude.

Mr. Littlepage: The question is a very difficult one to answer, but the important thing is to stick to the kind that grows the best in your locality. The Posey is grown in Lancaster County, Pa. The parent Posey tree grows in Indiana, and I had the pleasure of naming it. That tree is a good bearer, and it is the thinnest-shelled northern-grown pecan with which I am familiar. It is a very beautiful nut, with the exception that frequently one side of the kernel will not fill out as it does on the other sides. It is not defective, but simply deficient. It will have one full sized kernel but it is not perfect in

shape. I myself do not think this a very serious objection.

The Major is a fine bearing pecan, but the question is whether it is large enough to be good commercially. The Niblaek is the highest flavored pecan.

The following letter from Mr. J. F. Jones, vice-president of the association, was then read:

I am very sorry not to be able to attend the meeting this year. My son, who has the overseeing of the outside work and, in my absence, the general work, is incapacitated, due to an operation for appendicitis last week and, with a number of men at work on particular jobs, I cannot get away.

I am sending a few nuts which may be of interest to visitors. About half of my young pecan trees are bearing this year and a few trees are quite full. So far, Busseron shows up the best in bearing, with Posey second, and Niblack third. The English walnuts are a good crop. Mr. Bush has a big crop of these, and older trees in general have a good crop. The Rush hazel is bearing a big crop as usual. So far this is the only variety in any species to bear heavy annual crops here. The weather, seemingly, has no effect on the setting of the nuts. Last spring we had it down to 10 above zero when this was in bloom, but it set a full crop from both hand and natural pollenization. Hybrids of this and the best large fruited Europeans which have come into bearing are very promising, but it is too early to judge as to their bearing.

Put me down for new memberships or cash as last year, or for my part in any arrangement that may be decided upon to take care of the indebtedness of the association, or to advance its usefulness. I shall also be glad to extend the offer of two nut trees as last year, to new members, if it is thought this will help in securing the new members. Offerings this year would be Stabler black walnut seedlings, Chinese, Mayette, Franquette, Eureka, etc., in the English or Persians. Also seedlings of the Rush hazel, if wanted.

Having been nominated vice-president of the association two years ago, it may be understood that I am in line for the presidency this year upon the retirement of our honorable president Mr. McGlennon. If so, I wish to ask the nominating committee not to consider my name as I cannot accept this responsibility. With the vast amount of correspondence incidental to supplying information to those wanting to engage in the growing of nuts or nut trees, and growing and selling

nut trees, experimental work and breeding new types and varieties. I have my hands full and could not do this position justice. We also have members in the association better fitted for this position who can give it better thought and attention, and who can advance the association and the interests of nut growers more than I can, while I can be of more benefit to the association and the nut industry in general without taking on the duties imposed by any official position.

NOTES BY MR. BIXBY

Thursday, Sept. 27

Trip by automobiles to Mr. Littlepage's farm at Bowie, Md., and to the U. S. Experiment Station at Bell.

Mr. Littlepage has an orchard of 275 trees covering thirty acres of pecans and Stabler black walnuts, the first pecan trees being set in 1914, and the Stabler black walnuts some three years later. Now both are starting to bear, a few nuts having appeared last year, and a very few nuts the year before.

The trees are growing finely, the leaves have a fine dark green color, and nuts were noticed in clusters, the pecans being in clusters of 2, 3, 4 and 5; and the black walnuts in ones and twos.

That the orchard has been given good care is evident. Commercial fertilizers and green manures have been used. A winter cover crop of rye was grown last fall and plowed under this spring, and a summer cover crop of soy beans was grown this summer and will be plowed under this fall.

The varieties noticed in bearing were the Major, the Greenriver, Stuart, Busseron and the Indiana. Of the above, all are northern varieties, excepting the Stuart, which is a southern variety which has given evidence elsewhere of being able to grow and to bear further north than almost any other southern variety.

The pecans are set in blocks, the earlier ones being set 60′ x 60′. Mr. Littlepage became convinced after his first plantings that this was too close, and the last planting of pecans was 100′ x 120′.

The black walnuts are planted along two fence rows, the trees being fifty feet apart, the total length of the rows being about three-quarters of a mile. The peculiarity of the Stabler black walnut of bearing some nuts where the kernel is in one piece, that is where one lobe of the kernel has not developed, was noticed in some of Mr.

Littlepage's trees. There is going to be, in future years at Mr. Littlepage's place, an opportunity to study this peculiar behavior of the Stabler black walnut, that could be carried on at the parent tree only with great difficulty, because of the inaccessibility of the tree, in the first place, and the inaccessibility of the flowers, owing to their great height above the ground, in the second.

At Bell Station was seen Dr. Van Fleet's work on chestnuts. Some ten years ago Dr. Van Fleet began this work for the purpose of getting something that should be blight proof, or at least strongly blight resisting and that would furnish the nuts which the chestnut blight is rapidly making impossible of production. With this end in view, some ten years ago Dr. Van Fleet planted nuts of the Chinese chestnut, Castanea mollissima, and planted out the seedlings. He also procured from the place of J. W. Killen, at Fenton, Md., nuts of Japan chestnuts that had withstood the blight up to the time the nuts were planted. The first thing to be found out was how well these would resist the blight. None were found to be immune, although the trees are still alive after ten years exposure. Dr. Van Fleet's ambition was to get a blight-resistant chestnut the size of the Japan chestnut with the delicious flavor of the chinkapin. This, as yet, has not been accomplished, although some very good nuts much larger than chinkapins were seen. One interesting fact noted as to resistance was that the Japan chestnut, which is not generally supposed to be as resistant as the Chinese chestnut, was at Bell Station apparently standing up just as well.

At the evening session, Thursday, Sept. 27, a rising vote of thanks was given to Mr. and Mrs. Littlepage for their hospitality of the afternoon. The president then introduced Mrs. W. N. Hutt, editor of the Progressive Farm Woman, of North Carolina.

Mrs. Hutt quoted H. G. Wells as saying, "The primeval savage was both herbivorous and carnivorous. He had for food hazel nuts, beech nuts, sweet chestnuts, earth nuts and acorns." She went on to say:

In Spain and Southern France, the chestnut is now used much more than in the past. You should know in what appetizing forms they are cooked. It is a question how you should cook the chestnut if you do not want to spoil its flavor. Should you steam it, boil it, or what? When you want it in bread, or when you use the tasteless forms, it is first steamed or boiled, and later is mashed up and made

into bread, or mixed with cheese or tomatoes. But if you want to develop the flavor, then roast it, pick it out from the shell and crush is, using almost no other flavor with it.

Have you ever realized how much we depend on the walnut in cooking? Take the pecan, or perhaps almost all of the nuts; the flavor is diminished by cooking. But the walnut is the one nut that gains in flavor by being cooked. This means a great deal for the popularity of the walnut.

A friend of mine was captured by the Germans, and was sent out each day into the forests to gather acorns to be used in the prisoners' food. The friend said that many a time he thought he would rather die than to have to eat or gather any more acorns.

Farmers' Bulletin No. 712, "The School Lunch," by Caroline Hunt, has been especially valuable in the preparation of the school lunch with nuts. There is a man who comes to North Carolina every winter, who will tell you that he lives on ten types of nut oils and nut butter.

The great mass of people out through the country are not yet ready to comprehend this; but once they are educated to the value of nuts, the demand for them will be unlimited.

As to the question of economy, the prices should not go up any farther; they will not be used enough until they become cheaper. With many boys and girls in a family, a dollar's worth of nuts, at $1 a pound, will not go far. If we could get nuts at more reasonable prices it seems to me that women would consider them more than they do for food. They want them not only for their parties, but in every-day life.

We should popularize nuts through newspapers. It pays to advertise, and little notices in the paper are much more far-reaching than any other way of telling the story of the nourishment to be found in nuts.

As to the value of nut trees in landscape work, a real estate man told me that when he wanted a good price for a house he planted fruit trees at the back of the house, and nut trees on the sides. He would talk about those trees to the people who came to buy, and has sold many houses in this way.

Then take Arbor Day, and we have one in nearly every state in the Union. If we could get the papers and the forest magazines to talk about Arbor Day, and urge everybody to plant something, and particularly to plant a nut tree, it would not be long before we got

results. I could not think of anything much more patriotic than planting avenues of memorial nut trees. Nut trees are better to look at than are many of the monuments erected, and the patriotic societies do not realize the truth in this. There is a case where with a stroke of the pen, the nut trees could be increased all over the country.

Then consider the home demonstration agents in the country. They have the women organized and are in touch with the men of progressive thought and feeling everywhere; and it seems to me that we could make more use of them. It would seem that if this organization could in some way raise the money to have someone talk at these demonstration meetings, it would not be long before the value and the beauty of nut trees would show the use of doing this splendid work. What more effective methods could there be than to go to the state meetings held by home demonstration agents twice a year, and talk nuts to those people? They go home and talk these same things to all of the women in their little organizations and communities. There is no rapid transit method more effective than that. Then, when the women are taking up a subject like that, men are apt to read it also.

Another form of advertising that is equally important is in men's organizations. A number of years ago Mr. Hutt went down through the eastern part of the state on the old farmers' institute work. He took with him a case fixed up to display nuts. He talked about them, and especially about pecans. The people had never seen anything but the little, old, wild pecan, and they became enthusiastic. When you get a farmer enthusiastic you are doing something. The people became quite enthusiastic and planted quite a number of orchards. Mr. Hutt left the department and the new man who came in was not particularly enthusiastic about nuts. Then Mr. Curran came into the work and decided there was nothing he could do better than to urge them to plant nut trees. He is trying to get an unlimited quantity of pecans and walnut trees planted and he hopes to have a large number of trees put in within a few years.

To paraphrase what Mr. Littlepage said this morning, in connection with the raising of hogs, in getting the world to plant more trees, to use more nuts and to appreciate the value of nut trees for both beauty and use, you need 90 percent of advertising; and let the 8 percent be the man and 2 percent be the nut.

Dr. Morris: Last year, when my experiments with the use of

paraffin grafting had apparently been completed, I included what I knew of this subject in a little book, and this brought out letters from all parts of the country, in fact from all parts of the world, reminding me that I had not completed the subject of the use of paraffin in grafting. From tropical countries men complained that my suggestions about the use of one particular kind of paraffin, "Parowax," were not applicable to their part of the country where the paraffin would melt in the summer sun. Then, from some of the regions where the nights were cold, they said the paraffin would crack and leave the stocks bare, owing to the change of temperature.

We are consequently faced with a necessity for extending our information on this subject. My reason for presenting it, before I have completed investigations, is to get suggestions from members of the audience here, and from practical nurserymen. I have written a number of books on various topics, and have never sent one out without feeling sorry that it was not time for the next edition.

The theory is that if we cover a graft completely with melted paraffin, including the entire scion, buds and all, we have accomplished several things. In the first place, the paraffin prevents the graft from drying out before new cells can make union with cells of the scion.

In the second place it fills all interstices where sap would collect.

In the third place is provides an airtight covering so that the free sap pressures, negative and positive, under different temperatures, will be analogous in stock and scion. When there is low sap pressure we assume that some of the sap may be drawn out of the scion. This airtight covering prevents that.

In the fourth place it provides a translucent covering, which allows action by the actinic rays of light, which brings the chlorophyll into activity. All plant growth is conducted under the influence of chlorophyll, and the actinic rays of light activate this. Consequently, I seemed to have a perfect grafting material in this Parowax, which we may find in any grocery store. In my locality this wax worked perfectly and, theoretically, nothing more was to be desired. It melts at 125 degrees farenheit.

I have brought with me a specimen of a pear tree that I grafted in this way in July of this year. You will see that the Parowax covering is still complete. The new shoots have grown about eight inches since July 1, and I do not see how you could imagine anything more perfect than this specimen, from which I wrote my description in

the book. As a matter of fact it is by the use of the paraffin method that I seemed to have solved the very great problem of making it possible for anybody to graft anything, and at any time of the year. The most difficult thing to graft is the shagbark hickory, and we have even done that every month of the year, except December and January. This year we are going to try those months, for I believe that the hickory tree may be grafted any month of the year.

Now the point of my remarks will relate to different kinds of paraffin. This Parowax, which melts at 125 degrees farenheit, will be satisfactory in the north temperate regions. We may raise the melting point ten degrees, if we like, by the addition of the carnauba wax, which, however, is highly crystalline. A crystalline wax is not desirable because it cracks and permits the air to enter and we have a desiccation of the scion. The Standard Oil people will furnish paraffin with a melting point of 138 degrees, and that will cover all of our needs for hot countries. But in getting paraffins that melt at 136, 137 or 138 degrees we have a rather definite crystalline element. Mr. Bixby has suggested the use of the earth wax which is mined in Australia. It is really a fossil paraffin and is not so granular. I found that it is not to be had in this country at the present time, however, although various dealers told me that they had it, and I obtained from a firm in New York City a misbranded specimen called "Ozokerite," which they said is a technical term for this particular fossil paraffin. But it was nothing of the sort; it was something they had made up for themselves. Mr. Bixby kindly gave me a pound or so of the real "Ozokerite," so I had the genuine thing to experiment with. We may then settle the question of obtaining paraffines which have a high melting point, by knowing that they may be obtained from any of the Standard Oil people.

Knowing that we must have, in addition, the elastic feature, I found one man who had succeeded by adding something to a high melting-point paraffin. He said that it was a secret, but I soon found that it would be no secret to a bee. It would seem, then, that this quality in beeswax would be valuable, since the secret formula from this same dealer has little more than beeswax in it. Beeswax is a different kind of organic product from paraffin and I would not expect them to mingle naturally when in melted solution, but apparently they do. You will find that the specimens which contain this wax

are very smooth to the touch, and apparently are more homogeneous than paraffin.

The subject for experiment then, for members of this audience, is that of finding some substance that may be added to give elasticity, but which will not change the melting point. In the South we may require in addition something to whiten our paraffin. Some men in Southern California wrote me that they had fastened white paper about each graft and put a rubber band over it. I suggested this plan to one or two men in Australia and in Ceylon, who had complained about the melting of the Parowax, and I have not yet received their replies. I have been trying, however, to simplify things in the way of grafting. In addition to the elasticity that we need, we must have whitening, and for this purpose we must add something that will not be poisonous to the tree but will mix with the paraffin readily and give a white paraffin, which will interfere somewhat with the actinic light. I have found that carbonate of lead will mix well with paraffin. Carbonate of zinc will also mix well. They are both heavy, so heavy that they need a certain amount of stirring. A lighter substance is citrate of zinc, which will give elasticity, and which will probably also give a white effect. It melts with the paraffin and, being neutral, it will do no harm to the tree.

I have given you an outline on which I wish discussion, for I hope to get from this audience the information and suggestions that will enable me to make my experiments in the right way so that by next spring we may have no further need for discussing the question as to the correct paraffin method in grafting.

Mr. Bixby: There is another wax that is not so crystalline as the Parowax, and that is Candelilla, which is produced in Texas and New Mexico. It may be obtained from the wax importers in New York City, not from the Standard Oil Co., but the importers. I will find out just where it is from. I can easily get samples. Its melting point is not so high as Parowax, but it is much higher than any of the other waxes.

Dr. Morris: Then by mixing it with the high-melting point waxes, those of about 138 degrees, we might get good results.

Mr. Bixby: I think so, and without introducing the crystalline element.

Prof. H. H. Hume of Glen St. Mary, Florida was then asked to speak. He said that he uses fresh pine gum from the turpentine

cups to make grafting wax stick. This will mix with beeswax and give the elasticity needed for winter work (in the South). Also it is unaffected by a temperature as high as 120 degrees. He uses a mixture of high grade rosin, beeswax and pine gum with which pieces of cloth are saturated. Gum should be obtained in the spring when it is purest. It is thin enough to pour out.

Dr. Zimmerman said that he had tried pine gum with paraffine and it would not mix.

Prof. Hume said that beeswax can be had in various shades up to pure white.

Dr. Morris said that black grafting wax attracts heat and excludes actinic rays. He prefers a translucent wax.

Prof. Hume stated that in the country where Jacksonville, Florida, is there are 100 miles of roadway under construction which will be planted with nut trees where possible. He added that once when he was ill for a long time the doctor finally ordered a glassful of milk and a handful of pecan kernels for his diet. He tried it and it worked.

Dr. Zimmerman said that for grafting wax he had used equal parts of paraffin, stearic acid and beeswax with good results.

Dr. Morris stated his belief that the simple splice graft is the strongest kind.

FRIDAY MORNING SESSION

Sept. 28th.

The chairman of the Committee on Incorporation was called upon for a report and spoke as follows:

Mr. Littlepage: Under the Code of the District of Columbia there is a provision of law whereby any educational, scientific or charitable association can be incorporated and become a body corporate with all of the rights of any other corporation, so far as the corporate entity and liability is concerned. The provision of the District Code is a very liberal one and drafted to encourage such societies as this. The committee therefore thought it better to incorporate under this provision of the law than under that of some other state.

The advantages of incorporating a society of this kind are several. It makes the action of the organization that of a legalized corporation and takes away liability of individual members. If anyone should

desire to donate money to the organization, we would have a corporate entity that would be responsibile under the law for the safe handling of such funds. Under the law we can hold such funds up to the point where the income is not more than $25,000 a year. In the District of Columbia a corporation can take title to real estate, transfer property and do all necessary things in accordance with its by-laws. We therefore concluded that there could be no objection to incorporating under such laws. So with the consent of the other members of the committee, I prepared in my office the proper certificate of incorporation which, under the requirements of the Code of the District, are as follows:

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, all of whom are citizens of the United States and a majority of whom are residents of the District of Columbia, desiring to associate ourselves for scientific and educational purposes and for mutual improvement; and to organize a corporation under sub-chapter three (3) of the Incorporation Laws of the District of Columbia, as provided in the Code of Law of the District of Columbia, enacted by Congress and approved by the President of the United States, do hereby certify:

FIRST: That the corporate name of this company shall be The Northern Nut Growers Association, Incorporated.

SECOND: The term for which is it organized is perpetual.

THIRD: The particular business and objects of the society are the promotion of interest in nut-bearing plants, their products and their culture, and, in general, to do and to perform every lawful act and thing necessary or expedient to be done or performed for the efficient conduct of said business as authorized by the laws of Congress, and to have and to exercise all the powers conferred by the laws of the District of Columbia upon corporations under said sub-chapter three (3) of the Incorporation Laws of the District of Columbia.

FOURTH: The number of directors of the said corporation for the first year of its existance shall be five.

IN WITNESS WHEREOF we have hereunto affixed our hands and seals this 27th day of September A. D. 1923.

Karl W. Greene (Seal)

Albert R. Williams (Seal).

Thomas P. Littlepage (Seal).

DISTRICT OF COLUMBIA, TO WIT:

I, Alice B. Watt, a Notary Public in and for the District aforesaid, do hereby certify that Karl W. Greene (of the District of Columbia), Albert R. Williams (of the District of Columbia) and Thomas P. Littlepage (of the State of Maryland), parties to the foregoing and annexed certificate of Incorporation of *THE NORTHERN NUT GROWERS ASSOCIATION, INCORPORATED,* bearing date on the 27th day of September, 1923, personally appeared before me in the District aforesaid the said Karl W. Greene, Albert R. Williams and Thomas P. Littlepage, being personally known to me to be the persons who made and signed the said certificate and severally acknowledged the same to be their act and deed for the purposes therein set forth.

WITNESS my hand and seal this 27th day of September, 1923.

ALICE R. WATT,
Notary Public.

My commission expires December 17, 1923.

The smallest number of members with which corporation is possible, is three; so I secured two members, Mr. Greene and Mr. Williams, who, together with myself, prepared this, and put it in proper form. We then filed it with the Recorder of Deeds, keeping a copy for the files of the incorporation. The Recorder received it, and the fact that he received it was proof that it was satisfactory. We are now, therefore, a corporation.

Of course, we want to put that machinery into action, but in order to do so a board of directors has to be selected. Then will follow the election of officers of the Association. Therefore, I have prepared a report of the meeting of the incorporators, which I will read. As I said, however, we did this to get the machinery into operation. Next year the directors will be elected by the members.

MEETING OF THE INCORPORATORS OF THE NORTHERN NUT GROWERS ASSOCIATION, INCORPORATED.

The organization meeting of the Incorporators of the Northern Nut Growers Association, Incorporated, was held at Washington, D. C., September 28th, 1923, at 10:00 oclock a. m.

Present: Karl W. Greene, Albert R. Williams, and Thomas P. Littlepage.

Upon motion, Thomas P. Littlepage became Chairman of the meeting.

Upon motion of Mr. Greene, seconded by Mr. Williams and unanimously passed, the following were elected Directors of the Northern Nut Growers Association, Incorporated, for the first year of its existance, or thereafter until the annual meeting of the company in 1924.

James S. McGlennon, of Rochester, New York.
W. C. Deming, of Hartford, Connecticut.
Willard G. Bixby, of Baldwin, Nassau Co., N. Y.
Harry R. Weber, of Cincinnati, Ohio.
Robert T. Morris, of New York, N. Y.

Upon motion of Mr. Greene seconded by Mr. Williams and unanimously passed, by-laws of the corporation were adopted.

There being no further business, the meeting of the Incorporators adjourned.

KARL W. GREENE,
ALBERT R. WILLIAMS,
THOMAS P. LITTLEPAGE,
Incorporators.

The President: The next action, then, Mr. Littlepage, would be to get the report of the nominating committee. I call for that now.

Mr. Littlepage: (Reads as follows):

MINUTES OF FIRST MEETING OF DIRECTORS OF THE NORTHERN NUT GROWERS ASSOCIATION, INC.

The first meeting of the Directors of the Northern Nut Growers Association, Incorporated, was held at Washington, D. C., September 28th, 1923.

Present: James S. McGlennon, Willard G. Bixby, Robert T. Morris.

Upon motion of Mr. Bixby seconded and unanimously passed, the following officers were elected for the ensuing year, or thereafter until the annual meeting of the Incorporation to be held in 1924:

President, Harry R. Weber; Vice-President, J. F. Jones; Treasurer, H. J. Hilliard; Secretary, W. C. Deming.

There being no further business, the meeting adjourned.

WILLARD G. BIXBY,
Secretary of Directors' Meeting.

(The report was adopted by the convention).

REPORT OF THE FINANCE COMMITTEE

By Willard G. Bixby

Mr. Bixby: The finance committee asks the association to instruct the secretary in the printing of the next report to endeavor to reduce the size to one-half of the present report.

(Adopted by the convention).

Mr. Bixby: I move as an amendment to Article Two of the By-Laws, that annual membership be $3, or $5 including a year's subscription to the Journal. Contributing members to pay $10, this including a year's subscription to the Journal.

(Motion seconded and adopted by the convention, and the committee on Incorporation discharged with the thanks of the association).

Mr. Littlepage: I have nearly overlooked the fact that the organization must now have a corporate seal, with an appropriate inscription. An apropriate inscription would be "The Northern Nut Growers' Association, Incorporated." All such seals generally carry some appropriate design, and there are various ones to be had. I move that a committee of three be appointed to determine upon the design of this seal, and then later, if the chairman of the committee will send the design to me, I will have the seal made and send it to the association.

(Motion seconded and adopted, and Dr. Deming, Mr. Bixby, and Dr. Morris appointed as committee by the president).

After considerable discussion New York City was selected as the place for the next convention and the dates Wednesday, Thursday and Friday, September 3rd, 4th and 5th, 1924.

A vote of thanks to the president, Mr. James S. McGlennon, was adopted. The secretary was also instructed to write to Mrs. Hutt expressing the thanks of the convention for her address.

Dr. Oswald Schreiner of the Bureau of Plant Industry, U. S. Dept. of Agriculture was then introduced and spoke as follows:

In the successful growing of pecan trees, the proper care of the orchard is of enormous importance. (To illustrate this point, slides were shown of a good orchard and a poor orchard on a rather thin soil in the Coastal Plain Region. In the good orchard, the trees had been well cared for, the soil fertilized by the growing of legumes and cover crops plowed under; in the poor orchard, the trees had been

neglected and the soil impoverished by the continuous growing of cultivated crops, such as cotton and corn. The two views very clearly showed which orchard was on a paying basis and likely to prove a profitable investment). It is needless to say that the crop from such a poor, intercropped orchard would be meagre and unprofitable until the methods were changed. The growing of legumes to furnish humus, and even the growing of winter cover crops, such as rye, to be plowed under in the spring, cannot be too strongly recommended as soil improvers.

When nut trees are grown in orchards, they can no longer be considered as forest trees to be left to take care of themselves until a rich harvest of nuts is produced, but must be cared for just as much as any other fruit tree or cultivated crop or the harvest of nuts will never be forthcoming.

The fertilizing of nut trees, however, offers more difficulties than do the annual crops. Experiments on this subject have been few and the information obtainable is rather meagre. Consequntly, a few years ago, the Office of Soil Fertility Investigation, which is conducting fertilizer investigations on a large number of the annual crops grown on the prominent soil types or soil regions of the United States, started, in co-operation with the Office of Horticultural Investigations of the Bureau of Plant Industry, a number of fertilizer experiments on pecan orchards, involving a study of several soil types suitable for nut production and attempting to ascertain the proper fertilizer requirements for the pecan on these soils. While these experiments have been running only five years, which in point of time is very small in the life of a pecan tree, yet the different fertilizers employed already show some highly interesting results, sufficient to indicate that certain fertilizer applications undoubtedly influence the growth of the tree, its productiveness, and quality of the nut produced.

The experimental fertilizer mixtures are all prepared here in Washington in a fertilizer-mixing plant on the department's Arlington Farm, on the Virginia side of the river. The fertilizer house is well stocked with all of the various fertilizer substances used in agriculture, ready for mixing; nitrate of soda from Chili, potash from France and Germany, and our own far western states; cottonseed meal from the South, tankage and dried blood from the slaughter houses of Chicago and Omaha, Tennessee or Florida phosphates, and acid phosphate, ammonium sulfate from the coke ovens of Pennsylvania, Thomas slag

from England, in short, all sorts of commercial materials from near and remote sources, for study and use in fertilizers.

(Slides were then shown of the exterior and interior of the plant where literally thousands of experimental fertilizer mixtures are prepard to study the requirements of the various soils and crops, and are then shipped in freight cars to the various experiment places. Two slides showing the application of fertilizer in a large orchard where tractors are employed in carrying on the various cultural operations and also in a small orchard where hand labor is employed, were also shown).

The scheme of fertilizer experimentation adopted in this work is rather complete and so planned as to include fertilizers carrying the principal fertilizer constituents, phosphate, ammonia and potash, singly, in combinations of two elements, and in combinations of three elements, in various proportions in a regularly graded manner. The following scheme illustrates these mixtures of different analyses, the first figure denoting the percentage of phosphate, the second the percentage of ammonia, and the third the percentage of potash in the fertilizer. The various mixtures are numbered consecutively.

								1														
								20-0-0														
							2			3												
							16-0-4			16-4-0												
					4			5			6											
					12-0-8			12-4-4			12-8-0											
			7			8			9			10										
			8-0-12			8-4-8			8-8-4			8-12-0										
		11			12			13			14			15								
		4-0-16			4-4-12			4-8-8			4-12-4			4-16-0							
16			17			18			19			20			21							
0-0-20			0-4-16			0-8-12			0-12-8			0-16-4			0-20-0						

It is quite apparent that in this scheme the entire field of fertilizer formulas is covered in a regular way. In addition to this formula plan other experiments are also under way to determine the influence of the different fertilizing materials, carrying the phosphate, ammonia and potash, and the influence of lime, rock phosphate, various green manuring crops, etc. The experiments are carried out in commercial orchards on several soil types and in several localities.

While the years the experiments have been running are yet too

few for any final conclusions, and the details too numerous to present in a brief sketch here, there have nevertheless been some very interesting results from the use of fertilizers which is readily shown by a few lantern slides. Here is, for instance, a view of a fertilized and an unfertilized section of one of our experiments in Georgia. The views were obtained in the fall, and one could tell at a glance, not only that the unfertilized trees were not as large, but also quite strikingly that they had nearly lost all of their foliage, whereas the trees on the fertilized section were still in full foliage, thus presenting a very strong contrast. The effect of fertilizers on the foliage is shown also in a series of slides of representative trees, from one of our experiments in Louisiana, likewise taken in the fall. The first tree had not been fertilized, the second had been fertilized with phosphate and the third with potash. The one fertilized with phosphate appeared slightly larger, but it can again be observed that all three trees were, at the time the picture was taken, nearly three-fourths defoliated. The next two trees from the same experiment, fertilied respectively with a nitrogenous fertilizer and with a complete fertilizer, and photographed at the same time, show the influence of these fertilizers strikingly in that they are still in complete foliage, as well as showing a more vigorous growth. Three slides of fertilized and unfertilized trees from still different experiments all show the fuller foliage and better branching of the fertilized trees, especially those fertilized with the nitrogenous fertilizers or the complete fertilizers.

The yields of these trees cannot here be taken up but, in general, these fertilized trees came into bearing earlier and have yielded double and treble the number of nuts produced by the unfertilized trees.

(In conclusion, there was shown a slide of the yield of nuts from an experimental tract of a commercial orchard of about 20 acres, in which the yield from a fertilized acre was compared with the yield from an unfertilized acre. It was noted that the unfertilized acre gave a yield of approximately two barrels, whereas the fertilized acre gave an increase of two bushel baskets more than the unfertilized.)

Dr. W. E. Safford, Botanist, Bureau of Plant Industry, then spoke on the Use of Nuts by the Aboriginal Americans.

Dr. Safford: My interest in nuts has been confined almost entirely to those of American origin. For a good many years, I have been studying the plants, and plant products, utilized for food, and

for other purposes, by the aboriginal Americans, before the arrival in this hemisphere of Columbus and his companions.

In this connection, there is a striking contrast between the American Indians and the primitive Polynesians. The chief economic plants encountered by early explorers on the islands of the Pacific Ocean were identical with well known Asiatic species. Coconuts, breadfruit, taro, sugar cane, yams and bananas, the most important food staples of the Polynesians, had been known to the Old World for centuries before the Pacific Islands were visited by Europeans; the shrub, from the bark of which the Polynesians made their tapa cloth, was identical with the paper mulberry of China and Japan; and the principal screwpine, or Pandanus, from which the Polynesians made their mats, was a well-known species of southern Asia. A number of these plants had even carried their Asiatic names with them to Polynesia. The Polynesian language itself, with its varied dialects, spoken in Hawaii, Samoa, New Zealand, Easter Island and on other island groups, can be traced without difficulty to the Malay Archipelago, the cradle of the Polynesian race.

In America, on the other hand, every cultivated plant encountered by Columbus and his companions was new. Not a single Old World food crop had found its way to our hemisphere before the Discovery; not a grain of wheat, rye, oats, or barley; no peas, cabbage, beets, turnips, watermelon, musk-melon, egg-plant, or other Old World vegetable; no apple, quince, pear, peach, plum, orange, lemon, mango, or other Old World fruit, had reached America. Even the cotton which was encountered in the West Indies by Columbus the very morning after the Discovery, proved to be a distinct species and could not be made to hybridize with Old World cottons. Conversely, no American cultivated plants; no maize, no beans, tomatoes, potatoes, sweet potatoes; no cacao (from which chocolate is made); no pineapples, avocadoes, custard apples nor guavas; no Brazil nuts, pecans, or hickory nuts; nor any other American food staple had found their way to the Old World; even the beeches, chestnuts, oaks, and maples were distinct; and the same is true of the New World ground nuts and the grapes, which were the parent species of our delicious American varieties. Quite unlike anything in the Old World were such cultivated plants as the Cactaceae, the capsicum peppers, and the manioc from which cassava is made.

In Polynesia the evidence thus offered by cultivated plants points

to the spread of Asiatic culture eastward across the Pacific, while the peculiarities of the cultivated plants of America point to its isolation from all the rest of the world; an isolation which is further established by a radical dissimilarity of all American languages from Old World linguistic stocks. In no language of the New World, for example, is there a vestige of Hebrew, which would support the cherished theory of the migration to this continent of the lost tribes of Israel; nor is there a suggestion of any linguistic element to indicate connection with the Chinese, nor any relationship between the builders of the American pyramids and those of Egypt.

There are many distinct groups of American languages. Very often the language of a tribe is quite unlike that of its nearest neighbors; while at the same time it may resemble the languages of tribes quite remote. This fact indicates former segregation of the various groups speaking the unlike languages and a common ancestry or close association of the tribes speaking the allied dialects. As examples, I might mention the Quichua Indians of Peru, whose language is very unlike the languages spoken by the Arawak and Carib Indians to their northward and, at the same time, quite distinct from the languages of their Brazilian neighbors to the eastward. The Aztecs of Mexico spoke a language differing radically in structure as well as in vocabulary from the Maya language of their Yucatan neighbors; yet there is unquestionably a relationship between the Aztecs and a number of very distant tribes, shown by resemblances of their languages, as in the case of the Shoshone Indians of the northern United States and the Nahuati tribes of Salvador and Costa Rica. In the same way, the Algonquian dialects, which differ greatly from those of the Iroquoian, show a close relationship between very widely scattered tribes in North America, from North Carolina to Quebec. Such resemblances and radical differences point to a very remote and long-continued segregation which permitted the independent formation of distinct linguistic stocks; while the antiquity of man in America, both north and south of the equator, is further attested by the development of such a cultvated and highly specialized food staple as maize, whose ancestral prototype we have sought in vain. Its endless varieties, fitted for widely diverse conditions of soil and climate, also point to a long period of cultivation in dissimilar culture-areas, which enabled them to adapt themselves to conditions very different from those of the original stock from which they sprang.

All this evidence points to the peopling of this continent at a very remote time, perhaps as far back as the close of the Glacial Epoch; and it also indicates that the early progenitors of our Indian tribes had left their original homes in the Old World before any of the linguistic Old World stocks had taken shape; before Sanscrit was Sanscrit; before the languages of China or any other Asiatic people had become established; and just as in this hemisphere the natives developed their own languages from the most primitive elements of speech, so most certainly did they develop their agriculture from the wild plants of the fields, the swamps, the hillsides, and the forests. In both respects, as I have already pointed out, they differed from the Polynesians who brought with them to their island homes not only their language but their agriculture, from the cradle of their race in the Malay Archipelago; cuttings of seedless breadfruit and of sugarcane, fleshy roots of taro and yams; even trees, like the Indian almond and the candlenut.

Here I would like to point out to the members of the Nut Growers' Association the chief difference between nuts and other food staples. Nearly all of our cultivated vegetables, including maize, beans, potatoes, sweet potatoes, squashes and pumpkins, are annuals, sensitive to frost, which must be raised from seed each year, and which differ so greatly from the primitive plants from which they came that their ancestral forms cannot be definitely determined. Most of these vegetables are in all probability of hybrid origin, the result of cross polination and selection. In the case of our native nuts the conditions are quite different. We know the original ancestor of the pecan, our hickories and our walnuts. The fine varieties now cultivated are not hybrids but have been selected from wild trees. In connection with nuts I would also point out that in all probability they were the most important food-staple of primitive man, as well as of his simian ancestors. It required no great intelligence to gather them or to store them after the fashion followed by squirrels. Intelligence, however, is required to plant nuts and to transplant nut trees. Still greater intelligence is involved in the process of preparing certain nuts for food. A delicious creamy emulsion, for instance, was prepared by the Virginian Indians from hickory nuts. Cracking them and removing the kernels was too long and tedious an operation; so they developed a method of gathering them in quantities and crushing them in a hollowed log, together with water, pounding them to a paste and then

straining out the fragments of shells through a basket sieve. The milky fluid which was thus formed was allowed to stand until the thick creamy substance separated from the water. The water was then poured off, and the delicious cream which remained was used as a component of various dishes. This substance was called by the Virginian Algonkian Indians *"Pawcohiccora,"* a word which has been abbreviated and modified to *"Hickory,"* the name by which we now designate not only the nuts, but the tree and its wood.

It is interesting to note that a similar creamy or butter-like substance was derived by a similar process from various palm nuts in Central and South America. Cieza de Leon describes such a process in his Chronicle of Peru, in connection with a nut which was described as *Cocos butyracea,* but which was not a true *Cocos,* or coconut. Long before the discovery of America, a somewhat similar process was used in the Nicobar Islands for extracting a creamy substance from the grated kernel of the true coconut, *Cocos nucifera,* which in early times was called *Nux indica.* This process is still followed throughout Polynesia. Some of the most savory dishes of the Samoans and the natives of Guam are enriched and flavored with this coconut cream, which is a substance quite distinct from the water, or so-called milk, contained in the hollow kernel of the nut, which is so commonly used for drinking.

Coming back to America, I would call attention to the value of some of our native pine nuts and acorns as food staples. Certain Indian tribes of the Southwest live upon pine nuts at certain seasons when they are ripe. Dr. C. Hart Merriam has told of the utilization of acorns by various tribes of Indians in a beautifully illustrated article published in the National Geographic Magazine, 1918, entitled "The Acorn, a Possibly Neglected Source of Food." "To the native Indians of California," he says, "the acorn is, and always has been, the staff of life, furnishing the material for their daily mush and bread." He describes the process of gathering and storing them, shelling, drying, grinding the kernels, leaching out the bitter tannic acid, and preparing the acorn meal in various ways for food. In eastern North America, several species of acorns were somewhat similarly used, including those of the live oaks of our southern states. The Spaniards of Florida sometimes toasted them and used them as a substitute for chocolate or coffee. Chinkapins were used for food by the earliest English colonists. They are mentioned by Herriot, the historian of Sir Walter Raleigh's colony at Roanoke. In addition to

these, the early colonists learned to eat the so-called "water-chinkapins", which are fruits of the beautiful golden-flowered American lotus, *Nelumbo lutea,* a plant closely allied to the sacred lotus of India, China and Japan, whose nuts are even now used as a food staple. The split kernels of the latter may be bought in the Chinese shops on Pennsylvania Avenue in this city. The rootstocks of both the American and the Oriental lotus are also used for food. They resemble bananas joined together end to end, with several hollow longitudinal tubes running through them.

Before I close, I should like to call attention to a plant, endemic in eastern North America, whose tubers were called "ground-nuts," or "Indian potatoes" by the early colonists. The latter name caused the plant to be mistaken by certain early writers for the white potato, which was unknown in North America in early colonial days, but which was confused with the ground nut on account of the resemblance of the descriptions of the two plants. The white potato, *Solanum tuberosum,* was discovered in the Andes of South America by Cieza de Leon; it was quite unknown in North America or in the West Indies in the days of Sir Walter Raleigh and Sir Francis Drake, both of whom have erroneously been given the credit of introducing the potato into England. The "potato" which they observed in the West Indies was not *Solanum tuberosum,* which we now call the "white potato" or "Irish potato," but a very distinct plant, *Ipomoea batatas,* which we now call the "sweet potato," but which in early days was known as the *batata* or *potato.* The error which has become widely spread, can be traced to John Gerarde, the first author to publish an illustration of *Solanum tuberosum.* In his celebrated *Herball* he declares that the potatoes figured by him were grown in his garden from tubers which came from "Virginia, or Norembega." It is quite certain that this statement was untrue, and that, as certain English writers have already suggested, Gerard "wished to mystify his readers." Whatever may have been his motive, the error became widely spread. Even Thomas Jefferson was led to believe that "*Solanum tuberosum* was encountered in Virginia by the early colonists, and Schoolcraft declared that its tubers were gathered wild in the woods like other wild roots. The Indian potato of the early colonists is still abundant in "moist and marish grounds," as described by Herriot. It is a tuber-bearing plant of the bean family, and is known botanically as *Glycine apios.*

But I fear my talk has become too discursive, in turning from nuts

to ground nuts, and from ground nuts to potatoes; but the subject, bearing as it does on the origin and history of cultivated plants, is one which has great attraction for me, and I hope it may have been of interest to the members of this association.

Professor C. P. Close, Pomologist, U. S. Dept. of Agriculture, spoke as follows:

Mr. Close: The subject I had intended to speak on was "Extension Work in Nut Growing." Many of you know that I am putting in most of my time on the fruit end of extension work, but I am also doing some extension nut work. I was hoping that there would be representatives from many of the states here, because I wanted to encourage them to get in touch with the state extension men, to work up interest in nut culture.

My talk will be very brief, but I would like to mention that very few of the states as yet are doing extension work with nuts, especially in the North. Some work is being done with pecans in the South.

I have been astounded in talking with the landscape men in the North to find that they have not considered nut trees as ornamental trees. But after I mentioned that a walnut or a hickory or a pecan tree is an ornamental tree, and just as much so as the elm, the oak, or the maple, they thought it would be a good idea to use them and agreed to recommend the use of nut trees as shade, lawn and roadside trees. Then I suggested the filbert for clump planting as an ornamental. I hope in the future that nut trees and filberts will be used more extensively by the landscape extension men in their work throughout the country.

In most of the states there are fruit extension specialists but only an occasional landscape extension specialist; so I try to interest the fruit men in the planting of nut trees, and a few of them are doing this, particularly in Indiana, where the fruit extension specialist has been interested in having pecan and English walnut trees planted in school yards. It seems difficult to get people to comprehend and practice nut tree growing and to understand the various uses of nut trees. We can judge from the small audience at this meeting that there are not enough people interested in nut growing. In my journey throughout the country I occasionally run across men interested in growing a few nut trees, and I try to induce them to become members of this association; but it seems to be a hard thing to do.

A few days ago I called on a man in New Jersey who said he would have twenty bushels of hickory nuts and two or three bushels of English walnuts if the squirrels did not take them. He is up against a state law which protects the squirrels but does not protect him.

I wish we could send out word with you to the states to get at least a few people interested in nut culture, and have them write to the agricultural colleges and the experiment stations and arouse some interest along this line at those institutions, not only among the fruit extension men and the teachers, but also among the landscape men as well. There ought to be more interest taken in this work at our colleges and universities, and nut culture courses ought to be organized. The foresters ought to be induced to use nut trees wherever possible.

That is all of the time I care to take at present, Mr. President, but I wish to say that if there is any way of arousing interest in the states, I would be glad to carry the word from Washington and to push it just as hard as possible.

Hon. W. S. Linton, Saginaw, Michigan, spoke on "Roadside Planting vs. Reforestation," as follows:

As a delegate to the National Tax Association convention at White Sulphur Springs, it has been my lot to have been named on both federal and state committees, with the idea of exempting from taxation those who would produce trees for the future. My experience has been that exemption from taxation for the purpose of producing our future forests is a wrong one. The sentiment of the people is against exemption from taxation, and I do not know how it may be practically applied to the growing of the forests that our country must have in the future. But the individual will not carry out the work, and the corporations will not undertake it, so it devolves upon the government of the state to reproduce those forests. The government lives for a long period in between many life-times, and ours should live as long as the earth. It is therefore up to us to reproduce those forests which we once had and, as all things come back to the state, then the state should reforest.

Next the roadways are to be considered. Roadways will grow a better class of timber and trees; they are rich in soil, generally, because they pass through the most fertile regions of the country and, up to this time, they have been waste land. I believe that the farmer is right in his wish that trees which shut in the roadsides should be cut

away, that the sunlight should be let in and the roads hard-surfaced. We saw in our trip that where the trees shaded the roads they were almost impassable at times, while in the open places, they were fine.

In Michigan we took up the question of roadside planting, and Senator Penny fathered the bill, the pioneer measure, that caused our state to plant roadways. We have a very competent landscape engineer in charge of one of the departments, and he is planning to grow roadside trees, using nut-bearing trees, so that the next generation will profit largely by the work of today. And this is just because of this association.

When I was honored with your presidency, one of the features of the work we carried on was in getting nut trees from historic places, especially from Mt. Vernon. The Superintendent of Mt. Vernon very kindly told us that we could have the walnut crop from trees that were started there during Washington's time, and the only stipulation was that we should not commercialize the idea; that those nuts were priceless, and that we should not receive any money for them, but should distribute them in the schools and in a public way cause interest in the planting of nut trees. That very movement brought about wonderful results, and today there are from five to ten thousand walnut trees growing in our state, about the height of a man, all of them having come from Mt. Vernon.

On our way through from White Sulphur Springs, we passed through the home of Thomas Jefferson, Monticello, and we found some magnificent nut trees planted by Jefferson. Some of our best trees today are from those given to Washington by Thomas Jefferson; and I arranged at Mt. Vernon to secure some of the nuts from the trees Jefferson planted there.

Just yesterday Mr. Dodge, the superintendent at Mt. Vernon, again said that we could have the crop for this year. We will have a number of bushels from there, although the trees have not been as fruitful this year as usual, and I leave it to you to judge as to what we should do with those nuts this year. Some of you have ideas about this, and I would be glad to adopt them. But when the fact is known that the walnuts can be secured in that way the entire country will want them. At present I have letters from Texas and other places asking for some of Mt. Vernon's nuts. It is a movement that will cause more people, in my opinion, to have nut trees than any other, and we should push it to the limit.

I had a letter from Henry Ford's secretary, asking for a dozen trees which might be planted at Mr. Ford's place in Michigan. Mr. Ford is doing great good, so far as the saving of the forests is concerned. He has immense tracts of land where he is caring for every root and branch.

Letter from C. F. Bobler, Landscape Engineer in Michigan:

The laws of Michigan, as you are well aware, encourage the planting of trees and shrubs by the highway authorities, and protect existing roadside trees from injury or destruction. Under those laws considerable planting has already been done, and in such planting a liberal use has been made of the nut-bearing varieties of trees, especially the black walnut, which is indigenous to much of Michigan.

Besides the economic value of nut trees, on account of their food products while growing and their timber products when mature, they are generally very attractive in appearance, and, therefore, very well adapted to roadside planting.

Roadside development presents a field for considerable study to produce plantings which afford a variety of effects in trees and shrubs, by using varieties best adapted to the soil and climatic conditions, which best harmonize with the local topography and which to a considerable extent have an economic value in addition to their ornamental value. Nut trees admirably fulfill these requirements for roadside planting and while I believe that such other desirable varieties of trees as the American elm, the sugar maple, and others, should be used in proper proportions, I am fully convinced that the varieties of nut trees adapted to our soil and climate should be used liberally in the planting of the roadsides of Michigan.

The plans for the future development of the state trunk line highways in this state, contemplate the planting of the black walnut, butternut, sweet chestnut, hickory, beech, and other varieties of nut bearing trees in considerable quantities, and I am confident that their use will add to man's enjoyment of the highways and that these trees will become an economic asset to the regions where they are planted.

The President: There is one thing Mr. Linton mentioned that I wish to put special emphasis upon; the distribution of trees grown from Washington's home. Last year Mr. Jones sent out a lot of seedling walnuts and there are quite a few in Rochester. It was delightful to see the interest manifested by the people receiving those seedlings

and to hear how the people were succeeding. Some of them have written me.

Mr. Reed: Possibly it would help if, when any of us here present should chance to visit historic spots, we would get nuts from such places and send them to Mr. Linton; from Gettysburg or any of those places. We should each consider ourselves committees of one to get those nuts and to deliver them to Mr. Linton.

Mr. Bixby: I will see what I can do about it, and will get some of the nuts today.

Mr. O'Connor: I do not know how Mr. Linton would feel about sending to different schools some of the nuts that were given him by the superintendent at Monticello, and in letting the children have a little nursery, and the means to beautify their home towns, but I will say that if you get the children started in a thing like this, you will have the parents following up.

Mr. Linton: There is another point I wish to mention. Mr. Dodge sent one bushel of the walnuts which he said were taken from a particular tree that he admired. He thought it was the best variety of all of them. That tree, a year ago, was struck by lightning; so he requests that some of the trees produced from the nuts of that particular tree, be sent back to Mt. Vernon, in order that he may have some seedlings from the original tree. It is a fact that those nuts produced the best yields of any that we planted in Michigan, showing that the seeds from the best tree will bring the best results.

ENCOURAGEMENT FROM FAILURES IN GRAFTING

Dr. G. A. Zimmerman, Piketown, Pa.

After improving from an illness of several years, and feeling tired, impatient and at times discouraged with progress in my physical condition, last spring I secured a few bunches of scion wood and turned to my old boyhood hobby for diversion; this time, however, by working on nut trees instead of fruit. In presenting the following at the request of others, I do not claim any originality, but simply draw the attention of interested parties to some possibilities and probabilities. My results have been very variable and many of them show as successful a failure as any one could possibly obtain. The scions referred to

in the following tabulated record were put in from May 20th to July 20th and were well "mixed together" in the hope of giving better opportunity for cross pollenization, a few of every variety except the Hales being put in every day. The Hales were all put in late in July. I have grafted many other varieties of fruits and nuts but a record of the hickory only is shown below:

	No.	Growing	Died	% Growing	% Died	
Weiker	46	0	46	0	100	One graft to tree
	5	3	2	60	40	T.W.T 1¼" diameter
	5	1	1	20	80	U.W.T.
	23	1	1	4.2	95.8	U.W.T.
Taylor	5	2	3	40	60	U.W.T. 10" diameter
	27	7	20	25.9	74.1	
Fairbanks	15	11	4	73.3	26.7	
Vest	27	1	26	3.7	96.3	
Manahan	22	7	15	31.8	68.2	
	7	0	7	0	100	U.W.T. 3" diameter
Laney	13	6	7	46.1	53.9	
	15	1	14	6.6	93.4	U.W.T. 6" diameter
Beaver	5	2	3	40	60	Scions poor. But one grew 7 ft. 4 in.
Kentucky	19	7	12	36.8	67.2	
	10	1	9	10	90	U.W.T. 5" diameter
Kirtland	12	5	7	41.6	58.4	
	16	5	11	31.3	68.7	U.W.T. 5" diameter
	7	1	6	14.2	85.8	U.W.T. Put on late as also the Hales
Hales	a 6	1	5	16.6	83.4	U.W.T. 3" diameter
	b 35	0	35	0	100	U.W.T. 10" diameter
	c 2	2	0	100	0	T.W.T. 1½" diameter
	d 4	4	0	100	0	T.W.T. 2" diameter
	e 3	3	0	100	0	T.W.T.
	f 3	2	1	66.6	33.3	T.W.T.
	g 6	4	2	66.6	33.3	T.W.T.
Total	338	75	263	22.2	77.8	

The last two series of the Hales made 100% start also but bugs killed three grafts.

U. W. T. means a tree from which all the lower limbs were cut back to about a foot or eighteen inches and grafted, a few top limbs having been left intact.

T. W. T. means a tree from which the top had been cut, the lower limbs and stub having been grafted, although a few of the lower limbs were not sawed off.

A study of the above record is interesting. All of my stocks are of the mockernut type, varying from three-fourths to two inches in diameter, except a few trees to which I refer specially as T.W.T. and U. W. T. It will be noted that the Weiker and the Vest made the poorest catches. It could not have been due entirely to weather con-

ditions or the condition of the scions, for the scions of these two varieties were equal to anything I had. In view of the fact that they are both very desirable nuts, I always carried a few scions and kept placing them frequently as I placed other varietiese. Many Vests were placed at the same time as the Fairbanks, which shows 73.3% catches. The one Vest that did catch, however, made a very thrifty growth, showing that it is possible apparently to do well on the mocker nut.

With the Weiker, about the 15th of July, I put five scions on the limbs and trunk of a tree about $1\frac{1}{4}$ inches in diameter, the top having been cut out, with three catches, 60%, against another lot of 46 with 100% failure and 23 more with 4.2% success. Such antics are difficult to understand.

Many of the scions were put in the trunks of the trees; others were put on the small branches with the splice graft. The scions placed on the trunks, or the larger limbs near the trunk, apparently did somewhat better than the splice grafts further out on the limbs. In the walnut and other sappy trees, however, the splice graft out on the small limbs did better.

It is of peculiar interest that all of the large trees from which the lower limbs were sawed and the stubs grafted, the topmost limbs having been left, designated as U.W.T., did badly. While in the case of the five Hales, three had 100% and two had 66.6% catches. These two also had 100% catches but bugs ate the tender shoots and killed three of them. These trees had the tops cut off last fall leaving only a few lower limbs. They were put in on July 20th after the sprouts had well started on the trees. The sprouts were not taken off but their tops were pinched out. These grafts made a growth of from one to two feet or more. At the same time a tree was trimmed (Hales b in the record) and all the lower limbs grafted with Hales, leaving a few top branches only. Thirty-five were set and not a single one grew. The location of this tree was better than any of the five above referred to, because a couple of those trees were standing on the top of a rock where one would wonder how they could exist, and it was so hot when I placed the grafts that I had to quit and get out of the sun. In spite of that 100% grew.

A study of the above record leads to the conclusion that there is very little difference in plant and animal cells and it seems clear that certain old, underlying principles must be dealt with. I need not refer to heredity because, while it is undoubtedly quite possible, per-

haps, to influence heredity tendencies so as to get stocks to accept scions more readily, it is not the major issue for most of us just now. Next spring we will take what heredity has given us and be satisfied. However, it appears certain that our results in grafting the various stocks we now have will depend largely on our ability to:

1. Regulate plant circulation.
2. Stimulate cellular activity to a point compatible with wound repair, defensive and growing processes.
3. Control plant cell nutrition.

One of the very first things we physicians do upon seeing a patient is to investigate his circulation. If the pressure is too low or too high, for any reason, we immediately take measures to correct it, because we know that disastrous results will quickly follow if that is not looked after. Plant circulation, or sap flow, is no less important. Mr. Riehl, Mr. Jones and Dr. Morris made great strides when they advanced the ideas of covering the wound and the scion completely to prevent evaporation, thereby also controlling the sap pressure. With the exception of shading, pruning and defoliating, this is about the only method we have of preventing evaporation. Defoliation, of course, interferes with the tree's power of growth. Controlling the humidity is probably not practical on a large scale.

A proper and careful cutting of the tree beforehand is important. It appears that to cut the top completely out while the tree is dormant, so disrupts the routine circulation that the few lower branches which are left intact, are well taken care of and, it seems to me, that this, together with the stimulation of WOUND REPAIR by cutting and allowing time enough for the cells to get into action, was the prime reason for the 100% success in the three Hales and the cause of the 100% failure in the other Hales tree.

Other methods of controlling the circulation are of course drainage, irrigation, mulching, location of the orchard, placing of condensers of moisture, such as stones and other hard substances beneath the trees, and many other contrivances which are in use and which I shall not discuss.

With reference to stimulation of cellular activity we are considerably concerned. In medicine I have found the subject of wound repair and immunity most interesting, the two subjects seeming to be more or less related. Some animals will repair wounds and immunize readily, while others will not. In a general way young healthy animals

and human beings immunize most readily, while older ones frequently fail almost entirely. Interestingly enough plants seem to be strangely similar in this respect, and the thing that stimulates cellular activity for defensive purposes (immunity) apparently stimulates growth and wound repair. The thing that stimulates most actively for a special purpose is the thing itself, the best stimulant for wound repair being the simple injury. To illustrate briefly: In my work last summer I came in contact with two enemies, yellow jackets and copperheads. The copperhead stimulated me to carry a club in defense, while for the yellow jacket the club was of little value and I rather preferred carbon bisulphide. Had I ignored my senses and allowed nature full sway, as a tree does, the snake would have injected his venom and the yellow jacket his toxin, and my cells would have accepted their only alternative and proceeded at once to build up a specific defense, after which they would have been in better shape for development, providing the poison would not have been so great as to prove fatal. Injury to a tree certainly does stimulate wound repair, defense and growth. It is well known that trees with many transplantings, root injuries, transplant much more readily, and the nurserymen use this method of stimulation as a routine procedure. I learn in Florida that in order to transplant a good size palmetto, they are in the habit of digging down on one side and cutting the roots the year before removal. It will then transplant more readily. Pruning has the same cell stimulating effect if done at a time that will retain the stored nutrition. An attack of disease just as surely stimulates cellular activity and growth but it is too frequently followed by disaster.

We have all heard of driving rusty nails into trees (thinking the iron produced the beneficial results), cutting a slit in the bark of the limbs and trunk for "bark bound" so called, etc., all of which have stimulating effects with more or less permanent injury to the tree. Who knows but what the sap sucker, with his ability to dig into the bark and extract a piece of cambium, was not sent to us to aid in preserving our trees by stimulating new growth?

In my work last summer trees that were subjected to slight injury before hand apparently accepted a larger proportion of grafts. I will briefly cite two specific illustrations. A little butternut tree located near the house was the object of my efforts for over two years. During my illness I frequently went out and pruned a few branches or put on a few buds. Something would happen to me and possibly I would

not see it again for months, and in the meantime the buds would be strangled or knocked off. Another little hickory tree stood in the roadway. Harrows, plows, wagons and even logs were dragged over it. Grafts on both these trees caught rather readily last spring. In fact two black walnut grafts on this little butternut were two of the very few that I got to grow at all last year. My walnut grafting was almost a total failure. I have this to say, however, that I had no dormant walnut scions, my scions all being cut in May or June.

Mr. Jones, by marking the site of his patch bud several days in advance, admirably carries out this idea by locally stimulating the cambium cells. Dr. Morris's scheme of using white wax, besides regulating sap pressure, allows the actinic rays of the sun to stimulate cellular activity. Cutting the top out of the tree, which disrupts the normal circulation and throws it into the few lower limbs, besides stimulating the cells into activity, has apparently in a large measure accounted for the slight success that I have had. Other methods such as injecting some substance under the bark, applying antiseptics, or some stimulating chemical in a similar way, as "Scarlet Red" is used in skin grafting to increase epithelial growth, may aid materially. Certain chemicals applied to the tree and leaves, as used in sprays, seems sometimes to stimulate growth in a way that can hardly always be accounted for by the checking of the disease for which it was placed.

Much more could be written on cellular stimulation but enough has been said to encourage others to make observation in this connection, for it is highly probable that the lack of proper stimulation of the cambium accounts for more failures in top working trees than we are aware of.

3rd Control of Plant Cell Nutrition

With this topic we are probably less concerned in its relation to grafting than when the growing and bearing stages come. However, certain nutritional disturbances appear early and the more vigorously the stock is growing beforehand the better progress, of course, the grafts will make when they are started. Whether or not they will start more readily have I been unable to ascertain, but I have a bunch of little fellows with a growth of only an inch or so, and so puny that I cannot account for it in any other way than a lack of proper nutrition. Many of these little trees, used as stock, are very old in comparison with their size and they will probably be dwarfs all their lives. It

is a question whether many such trees should be grafted at all. Further observations will have to be made to decide that point. Perhaps proper preparation for a year or two would be beneficial.

This topic will largely be left for future discussion under another subject, but it occurs to me that much might be accomplished by proper attention to nutrition, especially when setting out trees for grafting, selection of proper site, fertility of soil, cultivation to aid absorption, etc. I have observed limbs of animals much smaller than normal due to prohibited movements or lask of proper circulation, one side of a tree developed out of proportion, eggs without hard shell due to lack of calcium in the hen's diet, and I know of an old English walnut tree that bears nuts with shells so thin as to be almost negligible. I am told that at one time this tree bore a nut with a much thicker shell. It has never had any attention and it is quite probable that the lack of proper shell building elements causes the trouble. I have grafted a few of these and I want to see what happens by furnishing better nutrition.

Concerning scion wood, I have "ringed" some limbs, similar to the method used sometimes in producing extra large fruit, in an effort to have the scion store up a large amount of nutrition. This experiment I shall continue in the spring.

This article is based entirely on my own ideas, observations and conclusions in connection with old standing principles. As previously stated, I claim nothing new and my only desire is to stimulate others to make like observations.

Carrying out my conclusions in my work next spring I propose to cut the tops out of all my trees, leaving a few lower limbs instead of the top ones, allow them to start growth a little before grafting, pinch the tip from that growth, and, in addition to covering with paraffin or some combination of it, shade the scions on the south-west side, either by tipping branches over them or some other way. Paper bags seem to absorb the paraffin. Double grafting in the case of the Vest and the Weiker will be tried. Whitewashing the stock to prevent sun burn will be used where necessary. Several other experiments based on the idea of cellular stimulation before the scions are placed in position will be tried.

Dr. M. B. Waite, of the Federal Insecticide and Fungicide Board, U. S. Department of Agriculture, spoke as follows:

Dr. Waite: Some of you may recall that several years ago, when

you were meeting here in this hall, I gave you a paper on the nut diseases of the northeastern part of the United States, and it would not be desirable to go over that same ground again. At that time, we took up the bacteriosis of the Persian Walnut, and filbert blight, and I outlined a program of proposed treatment for the filbert blight. It might be interesting to note here that Dr. Morris, and I believe also Mr. Bean, put that treatment into practice with success. The situation still remains, however, that we do not know of diseased plantings of any size. If we find a real plantation of filberts we will be glad to attempt control measures ourselves. I have planted about two dozen filberts and they still remain free from the disease. There are very few local hazel nuts, wild or cultivated, around Washington; but we understand that the few hazel nuts are free from this disease.

There are two or three things I wish to mention. One is the repeated inquiries reaching my office with regard to the non-filling of nuts, mostly the cultivated nuts, sometimes the pecan, sometimes the black walnut, and frequently the English walnut. The subject is a complicated one and the disease is not one that we can put under the microscope and diagnose at once. The trouble is due to a complex of varietal and environmental conditions, the effect of the conditions of growth, of soil fertility, temperature, soil, water and humidity, sunshine, etc., on that plant. Very often it is because people get the wrong variety and do not know what they have. They may have an unproductive seedling.

On the other hand a good variety may fail to bear in a locality where it is not suited. Very frequently the real lack is in soil fertility. Of course the success of the pecan trees down South around pig pens is an old joke to you gentlemen, but there is truth in that. For good nuts there is often need for a little extra manure or fertilizer, or perhaps both. Sometimes there are rich pockets in the earth where those trees would like to grow, or rich bottom lands which will produce without manure. I think one of the best ways is to fertilize with manure, if possible. Pollination troubles in connection with the non-filling and dropping of the nuts should be thought of.

Then there is another angle to be considered, and perhaps I can express it most definitely to you by citing the example of the June drop of peaches. Whenever a tree, like the peach tree or the pecan or the black walnut, sets its fruit in the spring, you will find that there are cross-pollinated and self-pollinated fruits. These will begin to

drop their nuts or their fruit at definite stages. Furthermore we will find the abortive seeds are not one size. This means that there were definite stages of the pollination and of the fertilization. I should like to work that up and find what the stages are.

The last big step in the dropping of the peach tree is the shedding of the fruit just as the pits are hardening. When they are hard the fruit does not fall. So this June-drop question ties in with the complications of pollination and nutrition. We know from experiments on the sterility of the pear tree, if highly fed and cultivated, such as those I worked on in the city of Rochester, that those highly fed trees will have some self-fertilized pears. In all of the pears we got no pears resulted when pollinized with the pollen of the same variety, except on those well fed trees. We learned this in the East, and have since found the same type of self-fertilized pear occurring naturally in California and other places in the West. In nut production that whole question of setting and filling is tied up in a complicated way with pollination and nutrition.

Aside from nutrition the other thing to be considered is that of disease. The common black walnut around Washington is generally poor from fungus leaf diseases. Those of us familiar with it around here know that they do not fruit well. This is not a good place for the common black walnut. The wild ones are nearly all poor. I was raised in the Mississippi Valley, where there were large nuts and fine ones, and we gathered those which fell from the specially good trees. They do not grow so well here, except the Stabler and a few others.

Leaving that subject, there is another I wish to take up. That is, the great number of complaints about winter-killing of the English walnut. Wherever we have been able to trace that down, as we frequently have, we find that the English walnut suffers more from winter-killing right around Washington, D. C., and in Pennsylvania, than up in Rochester; and we also have complaints of winter-killing as far south as Georgia. A common cause is the variation of moisture. After a dry spring and early summer soaking rains come in August and September, and the trees, brought suddenly into growth at the close of the season, when they should be drying out, the walnut tree in particular, show winter-killing. So I think one of the main troubles with the English walnut in the Eastern United States is the winter-killing. Even in Georgia we may have this trouble with the pecan, young trees two and three years old, and I have photographed them.

As to false stimulation, in the woods, where these trees grow native and under the conditions to which they are necessarily adapted, they are mulched and crowded when young by their competitors. In cultivation we do not get the crowding and the mulching that makes steady growth and proper ripening. So you should, by some process, growing corn, cover crops, or other trees, keep your delicate nut trees a little crowded and, if possible, mulched while young; and then later, cut out the undesirable things and let the trees have room.

I am not fully prepared to speak about the nut work of the Bureau of Plant Industry, because that should be handled by the chief of the bureau. I have charge only of the diseases of fruits and nuts. We have had $8,200 allotted to the project and will have $2,000 more this year, making $10,200. Originally that was $3,000 for nut diseases all over the United States. We started to work mainly on the southern pecan diseases, and partly on the bacteriosis of the walnuts of the United States. But the Southern Pecan Growers' Association got some additional money for the bureau, $5,000 of which was given to the fruit disease investigations, and was tied up with the other $3,000. But the wording of the bill said, "All for pecan diseases." So we transferred more to the project and made it $8,200 for the nut diseases. That means we have done very little work for the nut diseases except on Southern pecans, and I have been warned that one must not stress southern pecans with the Northern Nut Growers' Association.

We have had, however, one man, and will have two men, on the southern pecan diseases in Georgia, on pecan scab and pecan leaf diseases, who are winning out beautifully, and have nearly solved many of the problems, including the pecan scab. One of the difficulties is the occasional late summer rainy spell, bringing diseases and bad conditions. But in general we have solved the problem pretty well.

Then we have the more permanently dangerous disease, pecan rosette, which has taken about half of the pecans in some sections of the South, especially in south Georgia and in Florida. That disease is being experimented upon in the most extensive way of any of our projects. There is only one word to say about pecan rosette, and that is—humus—the disease is cured by the application of humus.

Mr. Reed: How far north is the walnut rosette disease?

Dr. Waite: As far as Falls Church, Va., but not much in the North.

Mr. Reed: The question was asked yesterday as to whether it could not be overcome in this latitude.

Dr. Waite: That nobody knows. The soils east and south of Washington are all acid, and the conditions are wrong for rosette. The soils have no tendency to chlorosis. They are, in fact, antichlorotic. Theoretically you could get the rosette conditions in the Piedmont region, but you are almost certain not to find them over this way.

Now in the organization of the Bureau of Plant Industry there are at least two main offices where nut problems would be studied; in the Division of Horticultural and Pomological Investigations and in my office, where the diseases are studied. Remember, also, that the insect pests are studied in the Bureau of Entomology; they have experimented quite extensively with pecan insect pests, and have the organization to handle such pests. Of course there is a Bureau of Markets and the Office of Soil Fertility in the Bureau of Plant Industry, which handle the pecan, incidental to the other studies.

Mr. Bixby: I would like to ask Dr. Waite a question. The association has spent a good deal of time in developing exact methods of measuring quantitatively the various characteristics of nuts which are considered valuable, and that study has given us methods of comparing notes from year to year, comparing the same nut, and I have noticed that it is quite frequent that the kind of nut that is good one year, will not be so good the next year. To take an example, the Clark hickory, which took the prize one year, the next year fell so far down that it would not take any prize. But after a good deal of trouble I found that by careful examination I could pick out from the nuts a few which tested up as they did before. It occurred to me that a condition of that kind would be more likely to be due to difference in the soil than in the fertility of the pollen. Dr. Waite has had more or less experience in noting the effect of the pollen, and I would like to ask if he thought this the cause of the difference in the nuts.

Dr. Waite: I think it might be the cause for a little difference, but we could account for the difference by entirely different things. By environment and other conditions. Take the apples grown in this vicinity; I have observed that certain seasons fit certain varieties. This year it was favorable for Ben Davis, and yet we have had a poor crop of most varieties; the conditions were bad for the Winesap to set, but yet the fruit is good. Every year and every day is different; and plants are subjected to these complications, and the yield, or the result

in fruit, is a response to environment. They are so very susceptible to these things. I came here this morning after picking some cross pollenated pears on the Arlington Farm. We have a lot of crosses there where we study the hybrid seedlings. Some will be almost too poor, in certain years, to deserve further attention, and good another season. In other words, these nuts probably do not vary any more from year to year than many of our fruits and vegetables do, and the main factor is probably response to environment, namely, temperature, air humidity, soil moisture and sunshine.

The President: I might mention that we have had a filbert orchard at Rochester for eleven years, and there has not been the slightest indication of blight there yet.

Mr. Reed: I would like to ask Senator Penny how the Roadside Bill is taken in Michigan.

Senator Penny: According to the Michigan law, the people along the roadside consider that their property is subject to the right of transportation on the highway; just as a stream is owned by individuals in Michigan, subject to the right of individuals to use it. This bill says, "Give the right to plant trees on the highway," and I think the planting is done with the consent of the owner. The agricultural college has a landscape gardener connected with the landscape department; he will have charge of planting along the roadside, and I think it will be done in a scientific manner; but I believe it is necessary to get the consent of the owners first.

Mr. Bixby: Last evening Mr. Franklin Weims, of Washington, was with me on the state highway of Maryland, coming south from Baltimore. The highway is being constructed at the rate of about eight miles a year, and funds have been provided. Mr. Weims feels that something should be done to see that the new highway is properly planted with trees, preferably nut-bearing trees. I was thinking that the association might, by some resolution, bring that matter to the attention of proper authorities. I would like suggestions.

Mr. Close: It might not be out of order to adopt a resolution and address it to the Governor of the state, Governor Richie; and also to the State Forester, Dr. Besly, suggesting that perhaps some of the trees and seedlings might be presented to the state, some of the trees that Professor Linton spoke of this morning. Trees of that sort might carry some weight.

THE PRESIDENT: Suppose we adopt a resolution and name Professor Close to take up this matter with the proper state authorities, speaking particularly of our ability to furnish seedlings from the Mt. Vernon trees.

MR. CLOSE: If it is the wish of the association, I would be glad to do that. (Motion made, seconded and adopted).

LETTER FROM F. H. WIELANDY, ST. LOUIS

Gentlemen:

First of all I congratulate you most heartily on being members of an organization which means so much to the public, as consumption of nuts is largely increasing and I much fear that the present day production is not in line with the demand.

Although only a nut culturist by proxy I have manifested a deep interest in this for many years, which is exemplified by the fact that on my different hunting trips, in which I have indulged for over thirty-five years, in the past twenty-five years I have also made it a point in the fall of the year, to have with me a large pocket full of such nuts as I thought would more easily come up and benefit some one in the future. I usually carried with me black walnuts, hickory nuts, pecans and acorns, and in my rambles through the woods and along the highways, I would plant these where I thought there would be less chance of their being molested if they developed.

In going over the same ground quail shooting, last fall, ground that I had covered more or less for a good many years, I began to see the fruit of my efforts, and felt repaid many fold for what I had accomplished.

Unfortunately we are a nation of destruction, rather than of construction, so far as our timber is concerned, and this is more noticeable in fruit and nut trees than in other varieties; although, being interested chiefly in these I possibly am biased.

When we stop to consider that a country such as Norway began to replant and reclaim their forests before Columbus discovered America, it strikes me that it should be a lesson for everyone in this country. Consider too, if you please, that before the war Germany paid her entire road taxes from nothing but the production of nut treee along the public roads. We also know, although a very small country in area, that it produced enough timber each year to satisfy the need for

building and commercial purposes in the form of packing cases, casks, etc. And here we are, a country forty times larger than Germany, and forced to depend on countries such as Canada and Norway for wood pulp out of which we manufacture a great many grades of paper.

Some twenty years ago I had a political friend introduce a bill during a meeting of the state legislature, which made it mandatory for the road overseeer to plant nut trees along the right of way all over the state; but like many meritorious bills, it was pigeon-holed until the next meeting of the legislature. It seemed an impossibility to resurrect this and an exceptionally fine forestry bill.

Unfortunately I promised to preside at a meeting of conservationists and it is for that reason that I am unable to meet and be with your honorable body, for I would like so much to be permitted in a humble capacity to assist in carrying on the work which you gentlemen are doing, as it is going to mean so much to future generations. I am sure that each of you feels as I do in this matter and that is that "He who serves others, best serves himself."

When the matter comes up for consideration I would like very much to have your next convention here in the Middle West, either in St. Louis or Alton, Ill., which is only a few miles north of St. Louis and in the vicinity of a splendid nut-producing section, particularly the pecan.

THE CHESTNUT

C. A. Reed, U. S. Department of Agriculture

No discussion of the nut industry in the North at this time would be complete without a brief review of the chestnut situation. The destruction wrought by blight in wiping out practically all of the native chestnut trees within its path, with almost equally fatal results to the European species has for the time being all but eliminated the chestnut from the consideration of planters in the eastern part of the country.

The chestnut bark disease has cost the country untold millions of dollars, and no wonder the public pauses for a second thought before investing in eastern-grown chestnut trees. Nevertheless, it is not

to be supposed that chestnut growing has disappeared from this country for all time. No plague has ever been known to wipe a race completely out of existence, and it is unthinkable that the blight will do so with the genus *Castanea*.

The native range of the American sweet chestnut centers largely in the Appalachian region from Portland, Maine, south to Atlanta, Georgia. The species becomes more sparsely represented as the distance increases in any direction from this central area, practically disappearing on the west, in the region of the Mississippi above Memphis. Its northern boundary might roughly be described as extending from lower Illinois through northern Indiana, southwestern Michigan, southern Ontario, central New York and middle New England. As was to have been expected, the blight has wrought its greatest destruction in places of densest representation of the chestnut species. It is in the outlying districts of scant frequency that the danger of infection from chestnut trees from the forest is least to planted trees, and likewise, there it is that combative measures should be most successful. Obviously, the farther from the center of the native range trees can be planted, the less is the likelihood of infection.

Well outside the native range of the chestnut species, there are a number of districts in the United States within which it should be possible to build up a new chestnut-orchard industry. In proof of this, there are many profitable trees and small orchards in the mid-west and on the Pacific Coast, particularly in western Michigan, northern Indiana, southwestern Illinois, in the eastern foot-hill region of northern California and in the Willamette Valley of Oregon. Probably the most outstanding instance of successful chestnut orcharding now existing in the entire country is a planting of Mr. E. A. Riehl, of Godfrey, Illinois, situated on the bluff of the Mississippi River eight milese west of Alton. Here Mr. Riehl has produced half a dozen or more hybrid varieties which are paying very satisfactory dividends on fertile hillside land which is mainly too steep for cultivation. A number of these varieties have been taken to northern California where they are proving highly successful.

In the Willamette Valley of Oregon, two species are represented with about equal frequency. These are the native chestnut from the eastern states and that from Japan. Neither has performed in such a way as to be particularly encouraging. The former has not been productive and the latter has produced nuts of quality so inferior as to

prejudice the planters against the entire genus. It is a difficult matter, therefore, to induce prospective planters in that section to consider any species of chestnut.

In the East, it is well known that the native species does not come into bearing until 12 or 15 years of age at best, and that to induce pollination and a set of nuts, it is necessary to inter-plant a number of varieties together. Had groups of varieties of American or European origin been planted on the Coast, instead of single trees of the former or varieties from Asia, it is not improbable that the present attitude toward the chestnut in the Pacific Northwest would have been quite different.

The work of the late Dr. Van Fleet, in hybridizing various chestnut species and in testing out Chinese and Japanese species with a view to determining their value as nut producers and their resistance to the bark disease, is familiar to most members of the Northern Nut Growers' Association. Since the death of Dr. Van Fleet, the work has been taken over by other hands in the Bureau of Plant Industry; but apparently, all of the hybrids now growing in the vicinity of Washington, D. C., are destined to succumb to blight. At present, practically every tree of the Chinese chestnut *Castanea molissima,* planted by Dr. Van Fleet at Bell Station, Maryland, where his work was mainly centered, likewise shows large blight cankers. But despite the gravity of the infections, it does not appear wholly improbable that many of these trees can be preserved. However, the wisdom of continuing propagation of the Japanese species is very doubtful, as the quality of nuts is usually of low order. Chestnut trees from China are generally light producers; but out of the total of several hundred at Bell, several this year have borne good crops. The flavor of the nuts is sometimes sweet, but oftener, otherwise; yet the average is superior to that of the Japanese chestnuts produced in the same orchard. Fortunately, it happens that the nuts from some of the trees of Chinese species which have been most prolific during the past season, have proved to be of high quality, comparing favorably in this respect with the native sweet chestnut. In size, the Chinese chestnuts average much above those of the American species, and while perhaps a shade smaller than those from Europe, they are of a size and quality which should readily appeal to market demands.

An early planting of Chinese chestnut trees at Lancaster, Pa., put out by Mr. J. F. Jones, Vice-President of the Northern Nut Growers'

Association, proved so susceptible to blight that all were subsequently destroyed. On the other hand, not infrequent reports are reaching the Federal Department of Agriculture of instances in which the species is shown to be highly resistant, even when grown within blight-affected districts. Secretary Deming is one of those from whom reports of this kind have been received. His planting, consisting of 12 trees put out in 1915 near Georgetown, Conn., has recently borne some nuts. Other cases, some reporting one way and others the other, might be cited; but let it suffice to say that the chestnut industry, although temporarily set back seriously, is not necessarily doomed.

REPORT OF THE COMMITTEE ON NOMENCLATURE

C. A. Reed, Chairman

While no new names of varieties appear to need consideration at this time, it may be well for the Association to refresh its memory regarding a few of the outstanding rules of the standard code of nomenclature by which the Society is guided in the recognition of names. In common with practically all other leading horticultural organizations of the country, including the National Pecan Growers' Association of the South, the Northern Nut Growers' Association follows the code of nomenclature of the American Pomological Society. Some of the provisions of this code are substantially as follows:

1. A name shall consist, preferably, of but one word, although under specified circumstances, two words may be permitted.
2. In selecting a name, "The paramount right of the originator, discoverer or introducer of a new variety within the limitations of this code, is recognized and established."
3. A name shall be recognized as fixed and shall have the right of priority over any others subsequently applied, after having appeared in print in such a way as to be definitely tied to a variety, or established.

These references call attention to the fact that the code does not define the meaning of the term "variety," and as it does not appear that a clear cut definition has appeared elsewhere in recent literature, in modern application, it may be well to state how it is being interpreted by this committee.

In horticultural practice a plant is not regarded as acquiring varietal status until it becomes distinctive among seedlings, because of super-

iority of product, unusual history, or other similar reason. Few tree varieties are recognized as such until after having been propagated by at least one asexual method, such as budding, grafting, layering or dividing.

The Committee calls special attention to a recent report on nomenclature, appearing in a bound volume of 546 pages, under the title "Standardized Plant Names." This report was prepared and published by the American Joint Committee on Nomenclature, which was duly appointed by the leading horticultural societies of the country. It represents the latest authority on matters of horticultural nomenclature, and is indorsed by the leading horticultural authorities of the present time. Of immediate interest to this Association is the fact that *Hicoria* replaces *Carya* as being the proper generic name of the hickory group.

NOTES FROM AN EXPERIMENTAL NUT ORCHARD

Willard G. Bixby, Baldwin, N. Y.

For several years the association has been advocating the planting of experimental nut orchards, and ever since I heard of this suggestion I have been desirous of having one and being able to contribute information to our knowledge of nut growing. Therefore since 1917 I have been assembling at Baldwin material which I hoped would aid in this. At the Rochester meeting some of the results were noted, and this year, I trust, something presented will prove of interest.

Chestnuts—Last year I expressed the belief that by carefully watching chestnut trees and cutting out the blight as soon as it appeared it should be possible to grow and fruit almost any variety in the blight area. This I have done with every variety that I have, but that is about all, apparently, that it is possible to do, for nearly all of my trees have been badly attacked by the blight at the crown; that is, at the junction of the root and trunk, and to cut out the blight means to cut down the tree. The most resistant variety noticed so far is the Boone, which has some Japanese chestnut parentage, but probably the Boone trees will not last over a year longer.

Apparently it is going to be necessary to get some resistant stock and do the grafting high enough to prevent fatal attack of the blight at the crown. Mr. P. W. Wang sent some Chinese chestnuts in the

fall of 1921, and I have now several hundred seedlings of what I suppose are Castanea mollissima, of which I plan to grow a number to rather large size, set them out where the next planting of chestnut trees is to stand, and graft the branches to fine varieties. It will take at least two or three years, however, before this can be done.

Hazels—For some four years I have been assembling, for hybridizing purposes, selected American hazels from various sections of the United States as well as the various European cultivated varieties that gave promise of being hardy. This year both blossomed rather freely, but the only variety of which I had enough pollen to work with was the Italian Red. The staminate flowers were picked from some six or eight American hazels which were blooming well and the pistillate flowers were pollinated with Italian Red pollen, in the hope that some hybrid nuts would result. Although the pollination was repeated twice I was much disappointed to find only an occasional nut as a result.

It is to be said in this connection, however, that there were practically no nuts on these American hazels which had not been pollinated with strange pollen; so the lack of nuts could not be laid to the artificial treatment given the flowers of those plants where it had been planned to make hybrids. Apparently it was due to climatic conditions that nuts were almost lacking on all hazels here this year; but I do not recall any severe cold spells when the hazels were in flower. Still, on one or two branches which I had tagged, as being particularly full of pistillate flowers, there were noticed an almost equal number of dead pistillate flowers a little later. It is seemingly going to be well to carefully study the development of the hazel flowers into nuts. They grow differently from the walnuts and the hickories. The hazel flowers apparently, after being fertilized, develop into stems on which the existence of nuts escapes the attention, at least of the casual observer, until about August, while the nuts on the walnuts and the hickories even though small at first, are plainly visible from the time they are formed by fertilized flowers until they are matured.

Hickories—The bearing age of the transplanted hickory so far has been almost an unknown quantity, and what we did know has been such that the association has hesitated to say much about planting hickories, its recommendations on the hickory being confined to that of topworking existing hickories. These are known to begin bearing soon after topworking, records of bearing in two or three years not being unusual.

On transplanted hickories, however, about all the information of which I know is as follows: The late Mr. J. W. Kerr, of Denton, Md., many years ago bought a number of shagbark hickories from a nursery, set them out and noted that the time that elapsed before they bore was about 25 years. Mr. Rush's Weiker tree, which bore in 11 years after being set out, cut down this time materially.

A Kentucky hickory on my place set out in the fall of 1917, flowered this year, but I had no pollen with which to fertilize the blossoms, and the nutlets dropped off. A young shagbark seedling set in its present location in the fall of 1919 and grafted to Barnes this spring, also set a nut, but this dropped off like those on the Kentucky and apparently for the same reason. It would certainly seem as if under favorable conditions, the transplanted hickory is not going to be anywhere near as slow as feared in coming into bearing.

Walnuts—A Royal and a Paradox walnut each supposed to be grafted trees with scions from Burbank's original trees, bloomed this year, and the Royal has a number of nuts on it. The Paradox has been here a very much shorter time, not over two or three years; so perhaps it is too soon to be expecting nuts. The Paradox is said to be a very shy bearer, setting nuts only occasionally, and then but few; still, one of my Paradox trees which is not over three feet high, blossomed full. It would seem as if it might pay to study this tree and see if the sterility or fancied sterility of this tree could not be overcome by seeing that proper pollen is at hand at the right time. A Cording walnut, a hybrid between the English walnut and the Japan walnut not quite 3 feet high, is bearing a nut this year.

Grafting—Perhaps the most interesting thing to be related is the result of attempts to determine the species of hickories best suited as stock for the fine varieties of hickories that we have. In preparation for this and through the kindness of Mr. Henry Hicks of Westbury, L. I., over 100 each of hickory trees of several species were obtained and set out in the fall of 1919. They were in fine condition for grafting this spring. There are some fifteen species of hickories native in the United States. The fine varieties of hickories that we have which are generally supposed to be largely shagbarks may prove to be much better adapted for grafting on some stocks than on others. A knowledge of this will prove to be of great value in top working. The grafting was done by Dr. Deming, on May 29, 30, 31 and June 1 of this year, 31 grafts being set on shagbark stock, 52 on mockernut, 53

on pignut, 47 on pecan and 91 on bitternut, a total of 274. There were also 343 walnut grafts set on walnuts of four species. The results of this work are summarized in the tables following:

HICKORIES, SCIONS FROM YOUNG TREES

Stocks, Number of Grafts and Per Cent of Catches

Variety	Bitternut No.	%	Mockernut* No.	%	Pecan No.	%	Pignut No.	%	Shagbark No.	%	Total No.	%
Barnes, scions												
Dr. Deming's trees	3	100.0	3	100.0	3	100.0	3	100.0	6	100.0	18	100.0
Gobble, scions												
Dr. Deming's trees	1	100.0	1	100.0	1	100.0	1	100.0	1	0.0	5	80.0
Griffin, scions												
Dr. Deming's trees	1	100.0	1	0.0	1	0.0	1	100.0	1	100.0	5	60.0
Hales, scions												
W. G. Bixby's trees	5	100.0	5	60.0	5	80.0	1	25.0			19	68.4
Kirtland, scions												
Dr. Deming's trees	3	66.7	3	33.3	3	66.7	3	66.7			12	58.3
Laney, scions												
Dr. Deming's trees	6	66.7									6	66.7
Long Beach, scions												
Parent Tree	3	33.3	3	66.7	4	50.0	1	25.0	3	100.0	17	53.0
Siers, scions												
Dr. Deming's trees	5	100.0									5	100.0
Stanley, scions												
Dr. Deming's trees	3	66.7	3	66.7			3	66.7			9	66.7
Taylor, scions												
Dr. Deming's trees	1	75.0	5	60.0	5	80.0	3	100.0			17	86.5
Total	34	80.8	24	60.8	22	68.1	22	72.9	11	75.0	113	74.0

*The mockernuts were larger than any other hickories grafted excepting some bitternuts referred to in the next footnote. They were grafted mostly on branches.

HICKORIES, SCIONS FROM OLD TREES

Stocks, Number of Grafts and Per Cent of Catches

Variety	Bitternut No.	%	Mockernut* No.	%	Pecan No.	%	Pignut No.	%	Shagbark No.	%	Total No.	%
Brooks, scions from parent tree, poor condition	5	10.0	5	0.0	5	20.0	5	40.0			20	20.0
Clark, scions from parent tree, poor condition	5	40.0	5	0.0	5	20.0	5	40.0	5	20.0	25	20.0
**Fairbanks, scions from parent tree (?), dry but otherwise good	27	57.8									27	57.8
Kentucky, from parent tree, poor condition	5	20.0	3	33.3	5	80.0	5	80.0	5	80.0	23	60.8
Manahan, scions from parent tree, poor condition	5	20.0	5	0.0	5	20.0	6	33.3	5	20.0	26	24.6
Vest, scions from parent tree, poor condition	5	20.0	5	0.0	5	40.0	5	60.0	5	20.0	25	20.8
Weiker, scions from parent tree	5	20.0	5	0.0			5	60.0			15	26.8
Total	57	45.0	28	5.5	25	36.0	31	45.6	20	35.0	161	32.9

*The mockernuts were larger than any other hickories grafted excepting some bitternuts referred to in the next footnote. They were grafted mostly on branches.

**Of these scions 5 were set in branches on two trees 1¼ or so in diameter and showed 100% catches; balance were set in the top on small trees ⅝ diameter or less, and showed 54.5% catches.

BLACK WALNUTS, JAPAN WALNUTS, PERSIAN WALNUTS BUTTERNUTS

Stocks, Number of Grafts and Per Cent of Catches

Variety	Black Walnut No.	%	Butternut No.	%	Japan Walnut No.	%	Persian Walnut No.	%
Adams Black Walnut, scions parent tree	13	15.4						
Alley Black Walnut, scions parent tree	9	0.0						
O'Connor Hybrid Walnut, Persian Walnut and Black Walnut (?), scions parent tree	9	22.2						
	31	12.9						
Ohio Black Walnut, scions W. G. Bixby's trees	17	64.7						
McCoy Black Walnut, scions W. G. Bixby's trees	9	77.0						
Stabler Black Walnut, scions some W. G. Bixby's trees, and some Dr. Deming's trees	85	51.2						
*Ten Eyck Black Walnut, scions W. G. Bixby's trees	32	97.0						
Thomas Black Walnut, scions W. G. Bixby's trees	23	100.0						
Wasson Black Walnut, scions W. G. Bixby's trees	8	75.0						
	174	69.5						
Persian Walnuts 4 varieties, scions about 2-3 from parent trees, all of which were quite vigorous growers							46	0.0
Aiken Butternut, scions W. G. Bixby's trees			39	38.5				
Lancaster Heartnut, scions W. G. Bixby's trees					53	3.8		

*One scion was overlooked in tying and waxing, otherwise apparently we would have had 100% catches.

In the above two groups of hickories the one where scions were cut from young, rapidly growing trees, contrasts unmistakably with those where scions were cut from old bearing trees. The same is shown in the table of black walnut grafts, where the Alley, Adams, and O'Connor scions were cut from old bearing trees, and the others from young, rapidly growing trees.

The poor success with the heartnuts is quite in line with previous attempts at propagating this species by grafting. Results shown here with the butternut are deemed reasonably satisfactory, in view of the well known difficulty of grafting this species. It should be noted here that, in the case of every graft that took and grew, it was the small buds that were successful, not the large ones. The total lack of success with the Persian walnut is inexplicable to the writer, but he knows of no previous attempts to graft Persian walnut on Persian walnut root.

Black walnuts show a very high percentage of catches, in the case of the Thomas and Ten Eyck varieties 100%, but in the case of the Stabler this is reduced to 51.2%. I would say in this connection that

neither of my two Stabler trees are vigorous growers, and so the trees grafted with scions from these are really cases where we have not been using scions from vigorous growing trees, and we know that this does not give a high percentage of catches.

The proper species to be used as a stock for the various varieties of hickories has not been shown conclusively for the number of grafts of each kind set was too few to be conclusive, and these experiments should be repeated. In the case of most of these varieties where results are poor, it was particularly noted when the grafts were set that the scions were in poor condition, a number of scions being thrown away because the cambium layer was dead. It is to be hoped that a species will be found to which will be well adapted the Vest hickory, which the writer regards, everything considered, as the best hickory that we have. Seemingly the pecan is the stock that gets the greatest number of catches; but the difficulty the writer has had in making Vest hickories on pecan root live, leads him to question as to whether another stock might not prove better. Another thing disappointing so far is in the seeming poorness of the mockernut as a stock. Over quite a large section of the United States the mockernut is the prevailing hickory, and in that section the mockernut will be most generally available for top working; moreover it will grow well in sandy soils where the shagbark is not found. In Petersburg, Va., the writer has seen it seemingly outgrow the black walnut.

The adaptability of the Barnes hickory on all stocks is notable, for it is the only one of the 10 fine hickories tested in the 1919 contest, of which this is true. If these grafts continue to flourish, and especially if future experiments check the results this year, the Barnes will have a peculiar value for top working. It is one of our best hickories, and, apparently is our surest variety for top working.

Mr. Close: I would suggest that we extend our thanks to the Smithsonian Institute for the use of this room for the meeting.

The President: Will you vote for that? (Motion voted upon favorably). I believe then, that brings to a close the Fourteenth Annual Convention, to meet in New York for the Fifteenth Convention in 1924, on September 3, 4 and 5.

This meeting is now adjourned.

Time—2:30 p. m.

Notes of this convention by Mrs. B. W. Gahn, U. S. Dept. of Agr., Washington, D. C.

APPENDIX

Among those present were the following:

Senator Penney—Saginaw, Michigan.
B. K. Ogden—3306 19th St., N. W., Washington, D. C.
W. G. Slappey—12 Boyd Avenue, Takoma Park, D. C.
S. von Ammon—Bureau of Standards, Washington, D. C.
A. M. Greene—Ridge Road, N. W., Washington, D. C.
Alfred Heine—Bowie, Md.
H. Harold Hume—Glen St. Mary, Fla.
R. H. Hartshorn, Washington, D. C.
Wm. S. Linton—Saginaw, Mich.
W. E. Safford—Botanist, Bureau of Plant Industry, Washington, D. C.
Dr. M. B. Waite—Federal Insecticide and Fungicide Board, Bureau of Plant Industry, Washington, D. C.
Dr. Oswald Schreiner—Bureau of Plant Industry, Washington, D. C.
Karl Wallace Greene—Washington, D. C.
C. A. Reed—Bureau of Plant Industry, Washington, D. C.
Mrs. C. A. Reed—Washington, D. C.
C. P. Close—Bureau of Plant Industry, Washington, D. C.
Mrs. C. P. Close—Washington, D. C.
W. R. Mattoon—Forest Service, Washington, D. C.
Thomas P. Littlepage—Washington, D. C.
John M. Littlepage—Washington, D. C.
Eunice M. Obenschain—Hotel Monmouth, Washington, D. C.
J. M. Richardson—Stormville, N. Y.
Robert T. Morris—114 E. 54th St., N. Y.
Dr. Llewellyn Jordan—100 Baltimore Ave., Takoma Park, Md.
Alfred V. Wall—2305 W. Lanvale St., Baltimore, Md.
Jacob E. Brown—Elmer, N. J.
Albert R. Williams—Washington, D. C.
Mrs. B. W. Gahn—Dept. of Agriculture, Washington, D. C.
James S. McGlennon—Rochester, N. Y.
Ralph T. Olcott—Rochester, N. Y.
Zenas H. Ellis—Fair Haven, Vt.
G. A. Zimmerman, M. D.—Piketown, Pa.
G. F. Gravatt—Forest Pathology, Bureau of Plant Industry, Washington, D. C.
Willard B. Bixby—Baldwin, N. Y.
John W. Hershey—Banks, Pa.
P. H. O'Connor—Bowie, Md.
John E. Carmoday—Charlottesville, Va.
Mrs. John Carmoday—Charlottesville, Va.
Mrs. W. N. Hutt—"The Progressive Farmer," Southern Pines, N. C.
Ammon P. Fritz—55 E. Franklin St., Ephrata, Pa.
W. A. Orton—Bureau of Plant Industry, Washington, D. C.
J. C. Corbett—Dept. of Agriculture, Washington, D. C.
W. G. Pollaret—The Star, Washington, D. C.
Prof. Lumsden—Federal Horticultural Board, Washington, D. C.

Exhibits Listed

Crops of 1923

Exhibit of Robt. T. Morris

1. Hybrid chinkapin (burrs and nuts).
2. Graft of pear tree (paraffin method).

Exhibit of C. A. Reed

"Rush" American Hazel.

Exhibit of C. P. Close

1. Seedling filbert.
2. "Van Fleet" hybrid chinkapin.
3. "Glady" walnut.

Exhibit of J. F. Jones

Persian Walnuts.

1. Wiltz Mayette.
2. Meylan.
3. Lancaster.
4. Lancaster (Same).
5. Eureka.
6. Hall.

Pecans.

1. Posey.
2. Busseron.
3. Niblack.

Hazels.

1. Rush (Three exhibits).

Cobnut.

1. (No name).

Filberts.

1. Fichtendersche.
2. Daviana.
3. Blumenberger.
4. Italian red.
5. Lambert nut.
6. Friehe Longe.
7. Gunzelebenner.
8. White Aveline.
9. Grosse Ronde.
10. Barcellona.
11. Spanik Gr.
12. Prolific.
13. Noce Lunghe.
14. Du Chilly.
15. Grant de Halle.
16. Buttners.

Exhibit of W. G. Bixby

1. Lancaster Heartnuts.
2. Royal Walnuts.
3. Hall Persian Walnuts.
4. Rush Persian Walnuts.

Exhibit of T. P. Littlepage (Grown on his farm).

1. Chinkapins.
2. "O'Connor" walnuts.
3. Mixture of varieties of European filberts.
4. Cluster of pecans (Indiana).
5. Littlepage hazels (which Mr. Littlepage called "American").
6. Spanish chestnut.

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

FIFTEENTH ANNUAL MEETING

NEW YORK CITY

SEPTEMBER 3, 4 and 5, 1924

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

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Schroeder, E. A., 223 East Ave., Rochester
Shutt, Erwin E., 509 Plymouth Ave., Rochester
Solley, Dr. John B., 968 Lexington Ave., New York City
Teele, Arthur W., 120 Broadway, New York City
Tucker, Geo. B., 110 Harvard St., Rochester
Vollertsen, Conrad, 375 Gregory St., Rochester
Waller, Percy, 284 Court St., Rochester
Wile, M. E., 955 Harvard St., Rochester
Wissman, Mrs. F. de R., Westchester, New York City
Wyckoff, E. L., Aurora

NORTH CAROLINA

Hutchings, Miss L. C., Pine Bluff
Matthews, C. D., North Carolina Dept. of Agriculture, Raleigh

OHIO

Beatty, Dr. W. M. L., Route 3, Croton Road, Centerburg
Coon, Charles, Groveport
Dayton, J. H., (Storrs & Harrison), Painesville
Fickes, W. R., Wooster, R. No. 6
Hinnen, Dr. G. A., 1343 Delta Ave., Cincinnati
Neff, Wm. N., Martel
*Weber, Harry R., 123 East 6th St., Cincinnati

PENNSYLVANIA

Althouse, C. Scott, 540 Pear St., Reading
Baum, Dr. F. L., Boyertown
Bohn, Dr. H. W., 24 No. 9th St., Reading
Boy Scouts of America, Reading

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*Life Member.

Davis, Miss E. W., Walnut Lane and Odgen Ave., Swarthmore, Pennsylvania. (1923).
Druckemiller, W. H., 31 N. 4th St., Sunbury
Fritz, Ammon P., 35 E. Franklin St., Ephrata
Gribbel, Mrs. John, Wyncote
Hershey, John W., E. Downingtown
Hess, Elam G., Manheim
Hile, Anthony, Curwensville
Jenkins, Charles Francis, Farm Journal, Philadelphia
*Jones, J. F., Lancaster, Box 527
Kaufman, M. M., Clarion
Leach, Will, Cornell Building, Scranton
Mellor, Alfred, 152 W. Walnut Lane, Germantown, Philadelphia
Minick, C. G., Ridgway
Paden, Riley W., Enon Valley
Patterson, J. E., 77 North Franklin St., Wilkes-Barre
Pratt, Arthur H., Kennett Square
*Rick, John, 438 Penn Square, Reading
Rose, William J., 55 North West St., Carlisle
Rush, J. G., 630 Third St., Lancaster
Smedley, Samuel L., Newton Square, R. F. D. No. 1
Smith, Dr. J. Russell, Swarthmore
Wilhelm, Dr. Edward A., Clarion
*Wister, John C., Clarkson and Wister Sts., Germantown
Zimmerman, Dr. G. A., Piketown

RHODE ISLAND

Allen, Philip, Providence

TENNESSEE

Waite, J. W., Normandy

UTAH

Smith, Joseph A., Edgewood Hall, Providence

VERMONT

Aldrich, A. W., Springfield, R. F. D. No. 3
Ellis, Zenas H., Fair Haven
Holbrook, F. C., Battleboro

VIRGINIA

Gould, Katherine Clemons, Boonsboro, Care of C. M. Daniels, via Lynchburg, R. F. D. 4
Harris, D. S., Roselawn, Capital Landing Road, Williamsburg, R. 3
Hopkins, N. S., Dixondale
Jordan, J. H., Bohannon
Moock, Harry C., Roanoke, Route 5

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*Life Member.

WASHINGTON

Berg, D. H., Nooksack
Turk, Richard H., Washougal

WEST VIRGINIA

Brooks, Fred E., French Creek
Cannaday, Dr. J. E., Charleston, Box 693
Hartzel, B. F., Shepherdstown
Mish, A. F., Inwood

WISCONSIN

Holden, Dr. Louis Edward, Beloit

CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay three dollars annually, or four dollars and a half including a year's subscription to the American Nut Journal. Contributing members shall pay ten dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Article V

Members shall be sent a notification of annual dues at the time they are due, and if not paid within two months, they shall be sent a

second notice, telling them that they are not in good standing on account of non-payment of dues, and are not entitled to receive the annual report.

At the end of thirty days from the sending of the second notice, *a third notice* shall be sent notifying such members that unless dues are paid within ten days from receipt of this notice, their names will be dropped from the rolls for non-payment of dues.

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REPORT OF THE PROCEEDINGS

at the

FIFTEENTH ANNUAL CONVENTION

of the

NORTHERN NUT GROWERS' ASSOCIATION, INC.

September 3, 4 and 5, 1924

Held in the

MUSEUM OF THE BOTANICAL GARDENS

BRONX PARK, NEW YORK CITY

EXCURSIONS

Baldwin, Long Island, Sept. 4 Stamford, Connecticut, Sept. 5

Chairman—PRESIDENT HARRY R. WEBER

FIRST DAY—MORNING SESSION

THE PRESIDENT: The meeting will please be in order, and we will have the secretary read his report.

THE SECRETARY: Secretary's Report for 1924.—Fourteen years ago, on November 17, 1910, two women and ten men, seers and prophets, met for organization in this building at the invitation of Dr. N. L. Britton, at that time and now, Director of the New York Botanic Gardens. We meet here again today by reason of his unfailing kindness.

Of the twelve persons present at that first meeting, three are here again, Dr. Britton, Dr. Morris and myself, and two are known to be dead, Prof. Craig of Cornell University, and Mr. Henry Hales, of Ridgewood, New Jersey.

The association has held an annual convention each year of its

APR 15 1925

existence except during the war, in 1918, when no formal meeting was held. An annual report has been published every year, except that the report of the proceedings of the first meeting was incorporated in the report of the second meeting, and the ninth report, that for 1918, has not yet been issued.

The present secretary has held the office every year except in 1918 and 1919, during military service, when Mr. Bixby took his place.

From an educational and scientific standpoint I think the association may be said to have fulfilled creditably its original declaration of purpose, "the promotion of interest in nut-bearing plants, their products and their culture." Many choice nuts have been brought to notice and perpetuated. The establishment of nurseries where grafted nut trees of choice varieties may be obtained has been encouraged. The art of grafting and propagating nut trees has been brought to a high degree of success by members of the association. Experimental orchards, both of transplanted nursery trees and of topworked native trees, have been established in widely separated parts of the country.

Acting on the suggestion and request of members of the association, Mr. Olcott established the American Nut Journal, one of the most important of our accomplishments. Finally, and perhaps best of all, a number of horticultural institutions have taken up seriously the study of nut culture and the planting of experimental orchards. Testimony to this will be found in letters to be read by the secretary and in the presence on our program today of representatives of several horticultural and other institutions of learning. I believe that the association can take credit to itself for having, by its publications and other means of influence, in large degree brought about this interest and action.

As for any commercial success in nut-growing, brought about by our activities, when we compare nut-growing in our field with pecan-growing in the South, and with walnut, almond, and perhaps filbert-growing, on the Pacific Coast, our results are meagre indeed. Of course commercial production, the building of a new industry of food supply for the people, is our ultimate goal. Why are our results in this direction, after fourteen years of effort, so small? Is it because we have devoted ourselves too exclusively to the scientific and educational aspects of our problems and neglected, either from over-cautiousness or from inertia, to encourage commercial plantings? There are some of our members who think that we have. They say that we

should have been bolder in assuring people of success to be attained in nut tree planting.

As for me I do not think that we have been too cautious. We who are so accused can point to the disastrous results of following the advice of commercially interested persons, results which have had much to do with retarding and discouraging nut planting and counteracting the labors of our association.

But now, however, I believe that we have reached a state of knowledge where we can confidently recommend the commercial planting of nut orchards. We recommend the Indiana pecan in many states; the improved black walnuts over a much wider area, and the chestnut in many localities where it is not a native tree. The top-working of native hickories and black walnuts also can be confidently recommended. In every case, however, the adaptability of the kind of nut to the locality should be passed upon by an expert. In every case, also, even in that of top-working native hickories and walnuts, intelligent and generous care is essential for any degree of commercial success.

It is probable also, that the planting of the European filbert can be recommended under conditions of intelligent care.

Now what of the association's future? The field is boundless but the working cash is wanting. Faith is unlimited but works are conditioned by want of appeal to commercial powers. It is almost a vicious circle, no commercial appeal no money, no money no development to appeal to commerce. But we do make progress and it is accelerated progress. In time we must necessarily arrive at our goal. Our lines of advance are sketched out and our progress along these lines depends on the energy of the workers and the means with which they have to work.

I shall ask the association to establish a rule as to when members are in good standing and when they should be dropped from the rolls for non-payment of dues.

I shall also ask for a clear understanding, in the form of an amendment to the by-laws, on the question of annual dues and their combination with the American Nut Journal.

It is desirable that we have a ruling as to a fiscal year.

The delay in the issuance of the annual report was due to my unwillingness to contract debts for the payment of which funds were not in sight.

The treasurer's report will show that we have a surplus in the

treasury to date of about $50. The report of the treasurer is too long to be read at this time, so I will simply repeat that it shows on hand a cash surplus of $50. I will turn the detailed report over to the auditing committee for their action.

TREASURER'S REPORT

STATEMENT OF ACCOUNTS OF THE NORTHERN NUT GROWERS' ASSOCIATION FROM OCT. 3, 1923, TO AUG. 31, 1924, BOTH INCLUSIVE

NOTE—Owing to delay in mails, the report given below is a later one than that used by the secretary. The one here included should have reached the secretary previous to convention, and it is the final, correct statement.

RECEIPTS

Membership—Plan No. 1	$ 2.00
Membership—Plan No. 2	19.25
Membership—Plan No. 6	111.00
Membership—Plan No. 7	149.50
Membership—Plan No. 9	8.25
Membership—Plan No. 10	7.75
Total receipts from membership	$297.75
Transfer of Funds from Former Treasurer	104.13
Contributions	235.00
Sales of Literature	10.01
Interest	.10
Total	$646.99

EXPENDITURES

Cash on hand		$ .80
Middletown National Bank, Middletown, Conn. (Deposit)		170.64
Litchfield Savings Society, Litchfield, Conn. (Deposit)		4.23
Charged to Loss. 2 Subs. to Amn. Nut Journal on former Treasurer's account		3.00
Expenses:		
Postage, Express and Insurance	$ 9.79	
Government Envelopes and Stamps	15.63	
Adhesive Stamps	8.54	
Postal Cards	1.25	
Postal Cards and Printing	3.25	
Registry Fee and Money Order Fee	.18	
Telegrams	1.18	
Reporting Proceedings of Rochester Convention	50.00	
Transcript of Proceedings of Rochester Convention	85.00	
Reporting, etc., Proceedings of Washington Convention	60.00	
Blank Account Book for the Association	5.00	
Seal for the Association	7.00	
1000 Letterheads	8.50	

1500 Letters	8.50
500 Letters, double sheet	8.00
1500 Circulars	6.50
500 Reports, (92 pp., including cover)	184.00
500 Manila Envelopes	2.00
Printing	1.50
Addressing and Mailing	2.50
	$468.32
	$646.99

Respectfully submitted,

H. J. HILLIARD, Treas.,
Northern Nut Growers Ass'n, Inc.

THE PRESIDENT: We will now be addressed by Dr. Britton, Director of the Botanical Gardens in which we are assembled.

DR. BRITTON: Mr. President and Members of the Northern Nut Growers' Association: By curious coincidence, in looking over the records of the New York Botanical Society's reports, I find the printed account of the organization meeting of your association. It is printed in the Journal of the New York Botanical Gardens, No. 132, for December, 1910. The article is written by George B. Nash. I believe I will read this report and if, perchance, the document is not in your files. I will turn this copy over to your president for preservation.

ORGANIZATION MEETING, NORTHERN NUT GROWERS ASSOCIATION

A meeting was held in the museum building on November 17, (1910) for the purpose of organizing an association devoted to the interests of nut-growing. The meeting was called to order shortly after 2 p. m. by Dr. N. L. Britton, who welcomed those present and wished them success in their undertaking. During his remarks he referred to a recent visit to Cuba where he succeeded in collecting nuts of the Cuban walnut, *Juglans insularis Griseb.* Specimens of these were exhibited and some of them presented to Dr. R. T. Morris for his collection of edible nuts of the world, deposited at Cornell University.

Dr. W. C. Deming was made chairman of the meeting and a temporary secretary was elected. The chairman read a number of letters from various parts of the country expressing an active interest in the formation of an organization such as was proposed. A committee of three was appointed by the chair to draft a constitution. This committee, consisting of Mr. John Craig, Dr. R. T. Morris and Mr. T. P. Littlepage, submitted a report recommending that the name of the organization be the Northern Nut Growers' Association, that residents of all parts of the country be eligible to membership, and that the officers be a president, a vice-president and a secretary-treasurer. An executive committee of five was also provided for, two of said commit-

tee to be the president and secretary-treasurer. The annual dues were placed at $2.00, and life membership at $20.00. The recommendations of the committee were adopted.

An interesting exhibition of nuts, and specimens illustrating methods of grafting, formed a feature of the meeting. Chestnuts, walnuts, and hickory nuts, including the pecan, were illustrated in much variety. Mr. T. P. Littlepage had a series of nuts of the pecan which he had collected from a number of selected trees in Kentucky and vicinity. One of these, almost globular in form, was of particular excellence, being of clean cleavage and delicious flavor.

Dr. R. T. Morris was elected president; Mr. T. P. Littlepage, vice-president; and Dr. W. C. Deming, secretary-treasurer.

George V. Nash.

Dr. Britton: May I say to you that our good wishes for your association, expressed at that time, are simply repeated now, and we hope that you will make yourselves at home and as comfortable as possible. We have made arrangement for the convention to leave here about one o'clock, for luncheon at Sormani's as guests of the Botanical Society. The autos will be at the door promptly, so I trust that you will adjust the session so as to be free to leave then.

The President: We wish to extend our thanks to Dr. Britton for his kind remarks and for his hospitality.

We will now have the secretary read reports from our state vice-presidents.

The Secretary: These are very interesting. The first one is from Mrs. Ellwanger, our state vice-president for New York.

(Reading in part) "My walnut trees are doing well and have many more nuts than ever before. The filberts planted two years ago, also have some, and the chestnuts, those the blight have left me, are covered with burs. There are beech nuts, too.—I intend to keep on planting chestnut trees, in spite of the blight."

Mr. C. S. Ridgway, Lumberton, New Jersey, writes as follows:

"There are very few nut trees in our vicinity. In fact, very few except what I have—some large old pecans at Mt. Holley, but the fruit is so small they are not gathered."

The next letter is from Mr. Howard Spence, of Ainsdale, Southport, England. Mr. Spence writes:

"During the last year I have got one of our horticultural research stations interested in the subject of walnut culture and just recently the headquarters of the Ministry of Agriculture and Fisheries also. The latter are using a small pamphlet on nut culture generally, to which I have contributed some facts. But a point of more definite interest at the moment is that the Minister has agreed to instruct all

their inspectors over the country to make a collection of all walnuts of merit and forward them to me for classification and identification of varieties which may be worth perpetuating. As almost all the large number of trees in this country are seedlings I am hopeful that some interesting material may be located."

Here is a letter from Mr. Richard H. Turk, Vice-President for the state of Washington:

"Your request for a report from this Pacific Coast state came as a surprise. The Western Walnut Growers' Association is very strongly organized as regards Oregon and Washington, and it is difficult to pursuade our nut growers here to join an association with its base of operations so far removed as the Northern Nut Growers' Association. I believe that I have been responsible for an additional membership of at least one or two which I think can be considerably augmented this fall.

Filbert growing has firmly caught hold of the enthusiasm of the people here. The acreage has reached 2,000 acres as compared to a bare 150 acres of six years ago. I estimate a planting of 1,500 additional acres to this quick bearing nut, this season. I have trees enough in my nursery to plant 600 acres but regard the majority of the plants as being too small. Planters plant even the smallest one-year layers out a distance varying from ten to twenty-five feet. I regard this as a waste of time, money and energy. Trees with two year old roots are none too big. The variety most planted is the Barcelona, closely followed by Du Chilly, and is supported by pollinizers for these two varieties at the rate of one pollinizer to every nine of the commercial sort. Intent eyes are watching every new seedling in search of new and superior varieties. Some have been found and will be propagated. Nut growers are but warming to the idea. I am putting out eight thousand four-year old seedling filbert trees in orchard form to be tested for qualities desired in a better filbert.

Tree filberts instead of bushes is a new idea that is fast gaining headway against the old method of removing the suckers by hand each season. *Corylus colurna,* the Turkish species, and *Corylus chinensis,* the Chinese tree hazel, are most favored as stocks. It has been found that these trees are easily grafted to filberts, that they are extremely hardy and grow twice as fast as the filbert, and that the vigor of the stock enlarges the size of the nut, regardless of variety. Foremost in the recommendation of grafted tree filberts, I have correspondants in many foreign countries and have arranged for the delivery of several thousand pounds of these nuts to grow seedlings of.

The tree hazel is of the future as yet, and one must recognize the demand for layered stock until replaced by what appears to be better. To add at least thirty acres to my present filbert plantings this year is my desire. I am planting at least 400 trees to the acre as interplants in a grafted walnut orchard. No use in wasting time before the

trees begin to bear profitable crops. Three and four years at most for man-sized returns when using a ten foot planting.

One planting of Du Chilly filberts last year produced an average of close to 40 pounds per tree on nine-year-old trees and an average of 10 pounds on four-year-old trees. The spread of the latter trees was scarce four feet, and I counted 22 nuts on a branch eight inches in length. Mr. A. W. Ward reports an average crop of 200 nuts to each two-year-old filbert tree in his four-acre planting this season. These are also Du Chillys that are fast building up a sentiment favoring them before the lower-priced Barcelona variety. The Barcelona is a more vigorous tree and shells out of the husk 75% whereas the Du-Chilly is but 40% self husking, but that will not offset the differential of five to ten cents per pound in favor of the great, oblong nuts.

The *walnut* acreage of Washington and Oregon is approximately 12,000 acres and is now taking a new hold with all the additional planting being made up of *grafted* trees. The VROOMAN FRANQUETTE variety grafted on the California black walnut stock is the tree used in these plantings. Formerly, seedlings of the so-called second generation type were quite popular, but when it became evident that seedlings would not transmit the superior qualities of the parent, that method of propagation was thrown into the discard. Eight thousand acres of the acreage now out, are seedling trees that must be top-worked before Oregon will be truly famous for the quality of the nuts it produces. These seedling trees are paying at present under our present high prices after many years of barrenness.

My own 900 seedling trees I top-worked last year to the Vrooman Franquette variety, placing as many as thirty grafts in some trees and obtained an average of 70 per cent successful grafts. These grafts have made wonderful growth this season, and are quite capable of bearing large quantities of nuts next season. My crew of walnut grafters are becoming well known over a radius of 100 miles, and the work they are doing is a road to profit for many an owner of unproductive nut trees.

This fall I intend publishing some of the leading articles of the nut-growing authorities of this section, in conjunction with a catalogue well illustrated and containing my experience as a nut grower. Anyone contemplating planting walnuts or filberts may well send in their reservation of copy. Generally speaking, nut tree nurserymen and nut tree planters have not had time nor desire to add to the literature on this subject. I believe that when the nurserymen get behind the move to plant nut trees there will be some very interesting developments. There is one good thing in sight, and that is that it will not be the old-fashioned seedling that they will push this time. I think that you people of the East have got to make another determined effort to drive home the impossibility of seedlings ever being satisfactory. Outside the association a nut tree is a nut tree regardless of seedling and grafted trees, and one is expected to bear just as many fine large nuts

as the other and just as soon. After losing twenty to thirty thousand dollars in delayed returns from a seedling walnut orchard, is it any wonder that I oppose the planting of more seedlings by the unwary?

In concluding this report I wish to state that I have talked nuts before a score of different meetings during the last year, and in the press of Oregon and Washington have done much to encourage the prospective grower."

The Secretary: It seems to me that this report is one that will be very useful to nut growers in the East and very suggestive to beginners in nut growing. I would like to ask Mr. Reed if he has any comments to make on the report.

Mr. Reed: As I know conditions in the Pacific Northwest Mr. Turk has given an accurate report. The one criticism that I might make would be, perhaps, that there seems to be a probability of over-enthusiasm. This often occurs in any part of the country with respect to new things. It has been most conspicuous with the pecan in the South, and the almond industry in the West. As the pioneers in the nut industry in Oregon and Washington are acquiring greater experience they are increasingly more cautious with regard to such matters as varieties, planting sites, planting distances, interpollination, and others of kindred nature.

The industry in the Northwest is still comparatively small. It is centered mainly in the Willamette Valley of Oregon and to some extent in a narrow strip running north towards Seattle. The best informed are planting only in fertile, moist, properly drained soils so situated that air drainage is good. The local soils are much more variable than would be suggested by casual observation. Also, greater attention is being paid to air drainage in that part of the country than in the East. Several years ago there was a sudden drop in temperature from 32 degrees above to 24 degrees below zero, at McMinnville, Oregon. This proved fatal to trees and plants of many kinds, particularly those on flat bottoms or on hillsides from which, for any reason, the cold air was prevented from blowing to lower levels.

In addition to the species of nuts discussed by Mr. Turk, something might be said regarding the possibilities of chestnut culture in the Pacific Northwest. Numerous trees, planted singly or even in small groups found there, grow so well as to indicate plainly that the genus is capable of adapting itself to existing environment. However, both planters and consumers are generally prejudiced against the chestnut. This is easily explained for the reason that either suffi-

cient numbers of varieties have not been planted together to ensure interpollination, or Japanese chestnuts have been planted. Early planters were evidently not aware that most varieties are largely self-sterile, and they did not know that the average Japanese chestnuts are fit for consumption only when cooked. Had these two facts been taken into consideration by them, it is not improbable that there would now have been an entirely different situation regarding the chestnut in that part of the country.

THE SECRETARY: I have a few more reports. Is it the sentiment of the meeting that I go on reading them?

MR. REED: I would like to hear the reports.

THE SECRETARY: *Knight Pearcy, from Salem, Oregon,* writes:

"Both filbert and walnut planting have continued in Oregon during the past year. There has been a steady increase in the acreage of these two nut crops during the past five years but, fortunately, no planting boom.

The older walnut orchards are almost all seedling groves and many of these seedling groves are producing a very attractive revenue. Practically all of the new plantings are of grafted trees, it having been amply demonstrated that, while seedlings are often revenue producers, the grafted orchards bring in more revenue and at no greater cost of operation. Seedling orchards are offered for sale, but very few grafted plantings are on the market. The Franquette continues to be the principal tree planted, probably 95% of the new plantings being of this variety.

A co-operative walnut marketing association has been formed, and this year for the first time carlot shipments of Oregon nuts will be sent East.

The filbert, a younger member of the Oregon horticultural family than the walnut, is being planted as heavily as the walnut, if not more heavily. Probably 60,000 trees were planted in the Willamette Valley of Oregon last year. Production of filberts has not yet become heavy enough to supply home markets. It will probably be some time before Oregon filberts reach eastern markets.

No other nuts are grown commercially in the state, although the chestnut does well here."

Mr. T. C. Tucker, State Vice-President from California, writes:

"The principal consideration in relation to the California nut situation is a recognition of the tremendous increase in planting within the last ten years. Many of these newly planted orchards have already come into bearing. The marketable almond tonnage of California has increased until it is now over three times that of ten years ago. The walnut tonnage has doubled during the same period.

New plantings are going forward very slowly at the present time due to the conditions prevailing in the fruit industry in general.

Economic conditions, coupled with the keenest kind of foreign competition have interfered materially with the sale of almonds in this country, with the result that almond growers have been losing money every year for the past four years. At the same time the tremendously increased domestic tonnage has resulted in keeping the prices to the consumer very low in relation to pre-war prices and costs. The consumer has been getting the benefit of maintaining the domestic almond producers in the business. The fact that domestic tonnage cannot be kept down, as soon as a profit is in sight, warrants the American public in maintaining a sizable industry in this country by means of a protective tariff, even though it may appear on the surface as though it might mean increased prices. The experiences of the last four years have demonstrated beyond a doubt that increases in import duties have not resulted in increased prices to the consumer. They have, in fact, increased the competition to a point where prices have dropped rather than risen.

The same situation applies to walnuts, except possibly as regards losses to growers during recent years. The fact that walnuts ordinarily take longer to come into bearing than almonds has prevented any rapid increase in production such as has taken place with almonds. They are, however, facing many of the same conditions of keen competition from countries where costs of production are very, very low.

Conditions this year point to both almond and walnut crops of approximately the same size as last year. That means the walnut crop will be around 25,000 tons and the almond crop around 10,000 tons. The condition of the walnut crop seems to be about normal. Where irrigation is not available they are suffering from lack of water. Almonds this year are showing in many districts the disastrous effects of the unusually dry season. This will show up most strongly, however, in reduced tonnage for next year, and stick-tights for this year. These latter, however, are not saleable, so the consumer need not worry but that the almonds received in the markets will be good, edible almonds. What the final outcome of the drought will be it is a little too early to tell.

Pecans and filberts are produced in such small quantities in California that they do not affect the market in any way except possibly locally. There is nothing to indicate any abnormal condition affecting either of these in the few places where they are grown. No large plantings of either of these nuts are being made, since there seems to be considerable question as to how successful they will be from a commercial standpoint.

Chestnuts are not being planted as fast as they might be, especially in those sections of the state to which they are well adapted. With the rapid disappearance of the chestnut forests of the eastern states,

through the ravages of the chestnut bark disease, there is no reason why chestnuts could not be grown in California, especially in many of the foot-hill districts. This, of course, presupposes that the chestnut bark disease can be kept out of the state, and we believe it can be. The general price situation, however, is such as to discourage any extensive plantings at this time. The interest that is being taken in possible future plantings, however, is such that it appears reasonable to believe that the next few years will see materially larger plantings made, provided there is any improvement in agricultural economy conditions."

Mr. James Sharp, Vice-President from Kansas, writes:

"The only nut native here is black walnut, and the crop is heavy. There are some Stabler and Thomas planted here, and some grafted on native black are bearing. We have something like fifty grafted pecans planted of all varieties, but none bearing yet. The pecan is a native south and east of here in Kansas, and the crop is good, I understand. We also have a few grafted sweet chestnuts growing in Kansas which are bearing well, and more are being planted. I have one English walnut growing near my house, which had male blooms last spring, but no nuts. We do not think they will be a success in Kansas but we hope to grow some nuts on our tree next year, the first in Kansas."

Mr. U. H. Walker, Nacla, Colorado, who says he is probably the only one in that state attempting to grow nut trees, instead of fruit, writes of his attempts. His place is at an altitude of 5,800 feet, where he can at times look down into the clouds, and on clear days can look up into perpetual snow. Mr. Walker has black walnut trees that have produced crops each year for the last ten years, three pecan trees and two persimmons. He has been experimenting with nut trees obtained from the government for the last ten or twelve years, and is willing to plant and care for any trees which the members of the association would like to have tried out in the center of the Rocky Mountain district.

Prof. V. R. Gardner, Michigan Agricultural College, in a letter to C. A. Reed, says: "We are getting a very nice collection of hardy nuts started on our Graham Station grounds near Grand Rapids. These are for the most part young trees being planted in orchard form. We are also doing some top-grafting and as soon as we shall be able to accumulate more data upon which to base recommendations. I am inclined to think that we will put on a number of nut grafting demonstrations in the state. I am sure there will be a demand for it.

If your meetings could be held later in the year, perhaps some time during the winter, I think it would be easier for some of the station men to attend them."

Mr. Reed: Might I add that Prof. Gardner was at one time

Assistant in Horticulture at Corvallis, in the heart of the walnut district of Oregon. From there he went to Missouri as State Horticulturist. During the three years at that place he top-worked a considerable number of walnut trees with scions of supposedly hardy varieties of Persian walnuts, especially the Franquette, and such varieties of Eastern black as he could obtain. The Persian practically was killed out during the first winter. The black walnut tops are now coming into bearing, and considerable attention is being attracted to them throughout the Mid-West. Prof. Colby may know something further regarding the work in Missouri.

The Secretary: I hope you notice how many more reports we are getting from the men connected with the horticultural departments of the state institutions. Here is a letter from H. H. Bartlett, Director of the Botanical Gardens at Ann Arbor, University of Michigan:

"Our Botanical Garden in its present location is relatively new, having been established only in 1914. The development of permanent plantings has been mostly in the last two or three years, so you see we have as yet done nothing with nut trees other than to assemble what varieties we could get hold of. I must confess that the poor little things look much as if the wrath of heaven had overtaken them. We had 8 degrees of frost on the night of May 22d, when all the trees were in young leaf. All the nut trees were badly killed back, some below the graft, so I've had to pull some out. Since they had only a miserable start last year, they look pretty sad now. However, I'll replace where necessary, and hope for better luck next time.

If there should be an opportunity in the course of the discussion to state that we are prepared to receive and take care of nut trees that originators wish to try out in this region, I shall appreciate it. We are receiving occasional nut-bearing plants from the Office of Seed and Plant Introduction of the Department of Agriculture, and are very glad to act as a testing station for new introductions or productions.

In order not to give a false impression as to the extent of our work, I feel impelled to say that we haven't yet a nut tree in bearing, and only one over three feet high."

Mr. Conrad Vollertsen writes that he will not be able to be here as he had planned. He states that all of his 31 varieties of filbert trees, except one, have fairly good nut crops. His place, as you know, is in Rochester, N. Y.

Mr. F. A. Bartlett, of Stamford, Conn., writes:

"You may be interested to know that some of my nut trees are giving some results this year. A number of varieties of filberts are

fruiting, three varieties of black walnuts, almonds, Chinese chestnuts, heartnuts, besides the native hickory and butternuts."

Mr. Reed: According to Mr. Bartlett the Lancaster heartnut, which was introduced by Mr. Jones, is starting out in highly encouraging manner at his place near Stamford. It has grown well and is now a handsome, symmetrical tree. Indications are that it will bear well.

The Secretary: Mr. Bartlett takes good care of his trees. We shall hope to pay a visit to his place.

I have a letter from Mr. Hicks, Westbury, Long Island. He will be with us today, and he proposes in his letter that we make an excursion to his place on Long Island.

Mr. J. W. Killen, Felton, Delaware, in a letter to Mr. Reed, writes as follows:

"This year we are maturing some nuts on the cordiformis and sieboldiana types of the Japanese walnut (young trees 3 to 5 feet high) that had no staminate blossoms. These we are producing by crossing with the pollen from one of our best Persians. We are looking for something interesting from these nuts when planted and the trees come into bearing. But all this takes time and patience. We had more chestnuts last fall than ever before, and the prices averaged higher, about 20 cents per pound, wholesale. Our best chestnuts are looking good now. Will soon be opening; usually begin about the 5th to the 10th of September, to open up.

"We have not succeeded very well in propagating Mollissima (Chinese chestnut) but we find the quality of the nuts very good. All of our American sweet and all of the European type, including Paragon, Numbo, Dager, Ridgely, etc., have been gone for years, and left our Japs just about as healthy looking as they were 20 years ago, yet they were all set in the same block."

The Secretary: It is encouraging to know that Mr. Killen has a strain of chestnuts that will grow there without being destroyed by blight.

Mr. Reed: Blight is not serious with his trees.

The Secretary: It is with mine. But Mollissima has resistance.

Mr. Reed: The real pest in Mr. Killen's chestnut planting is the weevil. The nuts have to be marketed promptly in order to avoid destruction by this insect.

The Secretary: I have a letter from Mr. Littlepage, who regrets that he will not be able to be with us.

Another letter is from Mr. Riehl, who regrets that because of his age he will not be able to take the long trip from Godfrey, Ill., to

New York City. He writes to us of the place of the chestnut in northern nut culture, as follows:

"'Blight and weevil are the greatest enemies of this nut. Blight in all probability will destroy practically all native chestnut where it is native, and in all such districts the planting of chestnut orchards for profit will be useless until varieties are found or produced that are immune to that disease. In time this, no doubt, will be done. If I were fifty years younger and lived in a blight section, it would appeal to me to do something in that line.

Where the chestnut does not grow naturally it can be grown without fear of the disease. I have the largest chestnut orchard in the West, of all ages from seedlings to sixty years, with no blight.

Even were there no blight it would not be advisable to plant chestnut orchards where it is native because of the weevil. The weevil appears to be worse on the large improved varieties than on the smaller native.' Of course any one planting a chestnut orchard now would plant the newer, larger varieties, as they will always outsell the smaller. No one who has not talked with handlers of chestnuts can have any idea of the handicap the weevil is to sales and prices. Where the chestnut is not native the nuts produced will be free of weevils.

The place to plant chestnut orchards is where the chestnut is not native, on soils that are not wet. Such situations exist in the central west and westward to the Pacific coast. I have had reports of chestnut trees growing and bearing in all this territory, and have had favorable reports of trees that I sent there of my improved varieties.

There is a good market at good prices for good, homegrown chestnuts. My own crops so far have sold readily at 25 to 40 cents per pound wholesale, and the demand is always for more after the crop is all sold.

Of all the nuts that I have experimented with I have found the chestnut to come into profitable bearing sooner and more profitably than any other."

Dr. Morris: Some of the state vice-presidents have spoken of native chestnuts of good kinds. One obstacle, however, in the distribution of good chestnuts, has been the state laws which prevent us from sending chestnuts from one state to the other. I would like to ask Mr. Reed if it would be possible to make some arrangement at Washington whereby scions might be sent under government inspection to the West and to other parts of the country where blight does not exist. On my property at Stamford I had several thousand choice chestnut trees. The blight appeared and I cut out 5,000 trees that were from fifty years to more than a hundred years old. Among them there was one sweet American chestnut superior to the others. It had a very large, high-quality nut, and very beautiful appearance, having

two distinct shades of chestnut color. The tree was the first to go down with the blight but I have kept it going ever since by grafting on other chestnut stock. I would like mighty well to have that chestnut grow in other parts of the country. It would be an addition to our nut supply.

Furthermore I have among a large number of hybrids, two of very high quality between the American sweet chestnut and the chinkapin. I gave these to Mr. Jones. He found, however, that he had no market for them because of the fear of blight. I would like to present scions of this to anybody outside the chestnut area where chestnuts are being grown, provided I can do this under government methods. We should find a way to do this.

The Secretary: And not by boot-legging.

Mr. Reed: As Prof. Collins is more likely to be informed in regard to quarantine laws than I am he is the proper one to answer that question. I may say, however, that the federal department is unlikely to interfere in any way with the carrying out of state quarantine laws. Prof. Collins is now in the room. Dr. Morris, will you kindly re-state the question to him?

Dr. Morris: In brief, I have some very superior chestnuts. They will be valuable for hortieultural purposes in other parts, or in non-blight regions, of the country. I have kept them going by care and attention. I would be very glad to send those out of Connecticut, provided that the way may be found, by sending them through Washington to other states. It would be necessary, however, to have the scions treated in such a way as to make sure that the endothia spores had been destroyed.

The President: I suggest that Prof. Collins give the matter some thought, and when he gives his paper he will be able to inform us about that. We will now ask Mr. Reed for a report as to promising seedlings.

Mr. Reed: There are quite a number of new things which might be mentioned. One is a group of Chinese walnuts now in their second or third year in the nursery of Mr. Jones, at Lancaster. In this lot there are many beautiful young trees grown from nuts obtained for Mr. Jones by Mr. P. W. Wang, of Shanghai. They are from North China, the territory which I visited more than two years ago and from which I also obtained considerable seed. Of the latter we have now several hundred seedlings ready for distribution. Personally I would

like them to be distributed among members of this association. Mr. Jones has 300 or 400 of the Wang trees which he proposes to sell as seedlings. Others will be used as stocks for grafting varieties of *regia*.

Dr. Morris has already referred to the Chinese chestnuts. Mr. Dorsett, of the U. S. Department of Agriculture, has recently arrived in China for a two-years' trip. He will doubtless send many chestnuts.

Another particularly interesting group of nut trees is a lot of hazel-filbert hybrids produced by Mr. Jones. These are between the Rush and the Barcelona, or other European varieties. He now has plants three to five years of age in bearing. They average as high as a man's head. Practically all are in bearing with attractive clusters of nuts, and some are fruiting heavily. The Rush variety, as most members know, is a native hazel of unusually prolific habits of bearing. The nuts are of fair size and quality.

Recently I have seen some interesting pecan trees in the East. Two of these are on the Eastern Shore of Maryland, one in the outskirts of Easton and the other at Princess Anne; the former is a trifle the larger, measuring 15 ft 5 inches in girth at breast height, the latter measuring 4 feet and 2 inches at the same distance and estimated to be 110 feet high. It was grown from a nut said to have been planted in 1800. The nuts from these trees are small but well filled and much appreciated by their respective communities.

The President: We have the secretary down for a paper.

The Secretary: This paper opens a symposium on topworking hickory trees.

TOP WORKING HICKORIES IN THE NORTH

By W. C. Deming, Connecticut

I do not recall a single modern improvement of importance in the art of grafting nut trees in the North that is not due to either Mr. Jones or Dr. Morris, except that to Mr. Riehl belongs, I believe, the credit of the idea of waxing the entire graft, which is now the accepted procedure. Therefore I speak before these two gentlemen with diffidence. I do so in the hope that perhaps I may recall something which they have forgotten to make known, or that what I say may elicit from them available emendatory remarks. My experience of fourteen years on my own place, and of five years grafting for others, is the basis of my observations.

Compatibility of Species and Varieties

This question will be particularly discussed by Mr. Bixby who has been conducting careful experiments that should soon settle the question for the commoner hickories. A few scattering observations of my own may be useful.

It is generally believed that any species of the genus hickory will catch on any other, though not necessarily that the union will be blessed. It is self evident that any hickory will thrive on any variety of the same species, shagbark on shagbark, pecan on pecan, though even here close observation will probably disclose differences of compatibility. Probably any hybrid hickory will thrive on either of its parents. In some cases this may turn out to be a test of hybridity. For instance, the Barnes is one of the few shagbarks known to thrive on mockernut. It shows other evidences of mockernut blood.

I have found no hickory, so far, that does not appear to thrive on the shagbark, except the pecan. Even here there are differences. I have one Major pecan on shagbark that is over twenty-five feet high that has a very healthy appearance and that has shown staminate bloom for two or three years. I have also an Indian pecan that looks fairly prosperous. The Iowa pecans, the Marquart, Greenbay, Campbell, Witte, and others, catch readily and grow vigorously, at least for the first years. There are many data, however, on the adaptability of the pecan to the shagbark and the consensus of opinion is that ulti-

mate results are poor. This is probably because the shagbark starts early and makes its season's growth in about six weeks, while the pecan naturally has a much longer growing season. However, these observations have been made, mostly, in the South and it may be different in the North. The question is not yet finally decided.

The Stanley shellbark, H. laciniosa, is completely at home on the shagbark, apparently, but has not yet borne with me.

The Hatch bitternut grew luxuriantly on shagbark for a year but blew off.

The Zorn hybrid made a growth of one foot on shagbark but then was winter killed, apparently.

I have a back pasture full of vigorous pignuts, H. glabra, which for eleven years I have been grafting with faith which now seems childlike, that soon I would have fourteen acres of bearing hickory trees. Yet as a result of all these years of grafting the only hickories that I have found to thrive are the Brooks, which appears to be vigorous, the Terpenny, which is vigorous and bearing nuts in its fourth year, and possibly the Barnes. Not a single pecan survived more than a year, though many started. The Beaver hybrid makes a long splindling growth and then, in the first or second year, the leaves turn yellow and mosaic and the growth dies. The Kirtland, Kentucky, Hales, Taylor and several others, have all with me, proved failures on the pignut. Mr. Bixby's experiments appear to be showing somewhat different results.

The question of the compatibility of species and varieties is really a very important one because in some localities either the pignut or the mockernut is the prevailing species, and we wish to know with what species and varieties they may be successfully grafted. For instance, if the Barnes, which is an excellent shagbark, will do well on both the pignut and the mockernut, where so many other varieties fail, and the Brooks is at home on the pignut, these are highly important facts to be known by the man with fifteen acres of hilly woodland full of young pignuts and mockernuts.

Size of Stocks

I prefer stocks of moderate size, up to three inches in diameter. One gets greater results for the labor with these than with larger trees. Of course a tree of any size may be topworked but the labor is disproportionately greater, especially in the after care.

Cutting Back Stocks for Topworking

I doubt if it is important to cut back stocks during the dormant season, except that then there is more time. With larger trees this counts for a good deal, but in the smaller ones I like to cut them off just where I want to graft at the time of doing so. However, they may be cut off when dormant at the point of selection for grafting and later grafted without further cutting back. This reduces, or does away with the risk of bleeding. Except in very small stocks it is better to leave a number of the lower branches to prevent bleeding. When bleeding does occur it may be checked by making one or more cuts with the knife or saw into the sapwood of the trunk below the graft. Better results come when the cutting back is of the top branches and not the lower ones because of the stronger flow of sap toward the top of the tree. In my opinion a side branch should always be left at the point where the stock is cut off to maintain a circulation of sap. Otherwise the stub will often die back and the graft fail. Also, the cambium close to a side branch will be observed to be thicker and I infer that the circulation of sap is more active. I prefer to cut off the top half, or two-thirds of the tree and graft into the top and the side branches near the top.

Hickories in full foliage may usually be cut back without evident harm. Occasionally a tree will be apparently shocked to death. Sometimes when a tree in foliage is cut back severely the remaining leaves will turn black and partly, or completely, die, but the tree will throw out vigorous new growth later.

Trees up to three inches in diameter may have the whole top cut off, at the risk of occasionally shocking a tree to death. Such complete cutting back must be done in the dormant season or there will be severe and prolonged bleeding. This method has the advantage of forcing a tremendous growth in the grafts which will need careful support. This is much more easily done however, than when the grafts are in the top of the tree. Cutting back in the dormant season and painting with paraffine has not worked well for me as the paraffine has not adhered well for any length of time to the freshly cut surfaces. Probably this could be easily remedied if it were a real advantage. In the case of small stocks and branches where there is no bleeding and the paraffine adheres well green callus will often be seen spreading out beneath the paraffine over the cut surface.

Stocks should be vigorous. Dwarfed, stunted, submerged, hide bound trees make poor stocks. This is important, I believe.

Scions

The condition of the scion is the most important element for success in top-working hickory trees. The technique of grafting has been so simplified as to make it fairly easy, and native stocks are usually vigorous. But unless the scions have full vitality success will be limited. They should be plump and not pithy. A limited success is possible with scions of feeble growth, or those subjected to devitalising influences in keeping or handling, but the largest success will be had with well grown scions, cut from vigorous trees or grafts, whose buds are completely dormant, and have a fresh, green appearance on cutting. When the cambium layer shows a yellowish or brownish tint the scions are useless. Slender wood may make good scions but is more difficult to keep in good condition. Heavy wood from vigorous, young, grafted trees, or from cut back trees, makes the best scions and is the easiest to keep. Wood more than 1 year old and as large as one can handle makes good scions. Dr. Morris, with the use of the plane, has succeeded with astonishingly large scions and even branches. Sometimes buds are absent from these large scions or are very inconspicuous. They may be searched for with a lens.

Preferably scions should be cut when entirely dormant. Buds that show signs of breaking should be removed. Scions cut after growth starts may be used with success if there are dormant buds. This "immediate grafting," as Dr. Morris calls it has not been fully studied. It may be of great value. It is quite successful with the apple and the pear. It appears to depend chiefly on the presence of dormant buds of vitality.

The later in the season the dormant scions are cut the shorter the time they have to be kept, though probably this is not of importance if the method of keeping is right.

Keeping Scions

The larger the scion the easier it is to keep it. Dr. Morris cuts whole branches and keeps them in the sawdust of his icehouse. I have cut them two inches in diameter and kept them lying uncovered on the barn cellar floor into the second summer looking fresh and green. The smaller the scion the more susceptible it is to moisture environment. Scions must be kept where it is neither too moist nor too dry. Usually the mistake is made of keeping them too moist. The buds may start if the scions are too moist even when the temperature

is quite low. This happened for me when I stored scions for a week or two in the very cold bottom of an icebox. The most successful grafters keep scions with a sort of intelligent neglect. Dr. Morris buries them in the sawdust of his icehouse and it seems to make no difference if ice is there or not. I once tried keeping them in an icehouse over the ice and they became soaking wet. I have noticed that Dr. Morris 's sawdust seems quite dry. Mr. Jones keeps some, at least, of his in bins or barrels covered with burlap bags. He says that heartnut scions keep best not packed away but kept in the open cellar. I notice that Mr. Jones has been using some kind of mill planings in place of sphagnum moss. Branches and large scions will keep well in a medium that seems dry to the touch. Small scions, such as those cut from old parent trees, require careful handling to prevent shriveling, on the one hand, or bud starting on the other. A low temperature is probably desirable, but the right condition of moisture is essential to the proper keeping of scions for any length of time. I should naturally prefer to keep them in darkness, but I am not sure that it is important. Undoubtedly the access of some air is necessary but it would be difficult to keep it altogether away. I do not know how long scions would keep if entirely covered with paraffine. One year I dipped all the cut ends of my scions in melted paraffine but I am not sure that it is worth the trouble. One year I packed away my scions in rather moist sphagnum moss. The first time I looked at them they were enmeshed in mold mycelium. Later many of the buds started to grow. As suggested by Mr. Jones, dipping either the scions or the moss in half strength Bordeaux mixture will remedy the mold trouble. Parenthetically, this should be of help in keeping chestnuts, chinkapins, and other nuts that spoil easily with mold, for planting in the spring. Packing scions tightly and heavily covered in boxes for any length of time has been, in my observation, disastrous. In shipping scions a method advised, and one that I have followed with satisfaction, is to wrap the scions, either separately or together, in paraffine paper without any packing next the scions but putting it, instead, outside the paraffine paper. This packing may be sphagnum moss or mill planings slightly moistened. This also is wrapped in a moisture impervious covering and then in ordinary wrapping paper. For shipping long distances the moss or planings should be dipped in half strength Bordeaux mixture.

The surface of the bark of scions that are being kept should al-

ways be dry, never moist. But they should never be so dry as to look shrivelled. Until you know just what scions will do under the conditions you provide you should examine them frequently.

Equipment

The essentials are a knife, raffia and the wax heater with brush. A saw is necessary if stocks are to be cut back, and pruning shears are convenient for cutting scions into proper lengths and for trimming and pruning stocks. The knife most used is the grafting knife of Maher & Gross, with a three inch straight blade and a round handle that gives a good grasp.

I used to suspect that the men who said that scions ought to be cut with two strokes of the knife were trying to establish an unattainable ideal. But after Mr. Jones and Dr. Morris had taught me how to sharpen my knife I found that I could cut one that way myself sometimes. Mr. Jones's method of sharpening is to hone the knife flat on the surface next the scion and with a bevel on the upper edge. I found that this made scion cutting so much easier that I thought it was the whole secret. But one day I saw another doubter come up to Mr. Jones and ask him if it was true that he could cut a scion with two strokes of the knife. Mr. Jones said he thought he could but he had no knife just then. The man pulled out his pocket knife and asked if that would do. Mr. Jones looked at it, took a stick and with two strokes cut a perfect scion. Since then I have felt that there is something to it besides the way you sharpen your knife.

A very important element in shaping scions is to give a drawing motion to the knife by keeping the handle well advanced before the blade. The cutting is done with a draw and not a push. This is one of the most important factors for success in shaping scions.

It seems hardly necessary to say that the stroke of the knife should be away from the grafter. Yet it is a common sight to see beginners cutting to the thumb.

Dr. Morris showed me that if, in sharpening your knife, you hold the little whetstone between the thumb and middle finger of the left hand you are less likely to put a feather edge on it. A feather edge is something to clip the sprouting wings of any budding saint of a grafter. When you get the right edge on your knife often you can use it the whole day without resharpening, or at most with simply a stropping on a piece of wood or leather. But improper use of the knife, or the least knick, will spoil the edge and sometimes it will be

quite difficult to get it back. Therefore the blade should always be protected by a sheath, never laid down or used for cutting raffia, or anything but the actual cutting of the graft. For this purpose a leather sheath worn on the front of the belt, as first used by Dr. Morris, is almost a necessity. This sheath may be made by any leather worker and should have at least two pockets, one for the grafting knife and one for another knife to be used for trimming, cutting raffia and other odd things. It is convenient to have a little pocket for a pencil also and one may provide places for other articles of equipment at fancy.

I do not know that there is much to be said here about raffia. But a great deal has been said, and will be said, elsewhere, when the raffia is rotten and breaks in the middle of tying a graft. It is the devil's own stuff to carry when you don't carry it right. The right way to carry it is to tuck one end of the bundle under one side of your belt, pass the bundle behind your back and the other end under the other side of your belt. Then the raffia never gets mixed up with scions, tools and profanity and the end of a strand is as handy as the knives in your belt. On the whole I do not know of any binding material as satisfactory as raffia. It is stronger and easier to use when it is damp.

One of the great advances in the art of grafting is the use of melted wax. I believe that we have to credit Mr. Jones for this. The use of paraffine for grafting wax we owe to Dr. Morris. To him also we owe the Merribrook melter which has added so much to the comfort and convenience of grafting that it can be recommended as an outdoor sport for ladies. I do not like the brush that Dr. Morris recommends but prefer a stiffer one such as can be bought for ten cents.

Equipments vary with the individual and with the difference in the work to be done. Mr. Slaughter carries into the nursery, when he is working for Mr. Jones in the semi-tropical sun of Lancaster, a stool with parasol attachment. Mr. Biederman of Arizona has the most elaborate equipment which includes a table, planes, curved knives and gouges. Dr. Morris carries a knapsack. I like an ordinary light market basket that Mother Earth holds up for me when I'm not moving from place to place. When in a tree I stuff my pockets with scions.

A saw is usually a necessity. For portability I prefer a curved one that has a draw cut. It has also an aesthetic element and doesn't

look like a meat saw, which can't be said of Mr. Jones's saw that seduced Dr. Morris from church. For heavy and steady work I much prefer a carpenter's sharp hand saw. A two-edged saw is an abomination devised by conscienceless manufacturers for the seduction of innocent amateurs.

For pruning shears I have a personal fancy for the French, handmade instrument, each one individual, a work of art and a potential legacy to one's horticultural heir, if one doesn't let the village blacksmith monkey with it, as I did with mine.

On some grafts it is desirable to use a bit of paper, either beneath or outside of the raffia, to make waxing easier. For this I have found scraps of Japanese paper napkin very adaptive to surfaces and absorptive of wax.

On very heavy grafts Dr. Morris uses the Spanish windlass, as devised by him, for which he carries sisal cord, wooden or metal meat skewers, small staples and a mallet. He uses a chisel to cut slots in very thick bark and planes for shaping heavy grafts.

I have tried fastening in grafts with a nail, using iron and brass nails and bank pins. Mr. Jones has suggested cement covered nails. My experience with iron nails is that they damage the scions. The use of nails has not been fully worked out. They are almost essential in bridge grafting apple trees. I think that just the right kind of a staple might be a help with some kinds of grafts.

Paper bags, 2 pound size, are sometimes wanted, for protection from sun or insects or to make the grafts conspicuous. Mr. Jones shades grafts made close to the ground with a slip of paper.

For labels for immediate use the wooden ones, painted on one side and with copper wire fastening, are satisfactory. Attach them by the nurseryman's method, which it has taken me many years to recognize as the right one, by twisting the *doubled* wire around a convenient object. Do not separate the wires which will probably permit the label to flap in the wind and soon wear out the wires. I used to think that the nurseryman's method was the result of hurry or laziness.

Copper labels, to be written on with a stylus, cost $1\frac{1}{2}$ or 2 cents each, according to size. The smaller I consider preferable. I imagined that these would solve the label problem. Picture my disappointment when I found that many of them cracked, or broke off entirely near the eyelet, from flapping in the wind. If they are to be used they must be

fastened so as not to move with the wind. Mr. Bixby has an excellent label made on an aluminum strip printing machine. It has a hole in each end and is fastened with a heavy copper wire. He uses two of these labels on each tree. Dr. Morris sometimes uses a heavy wire stake to which he fastens the labels. A good method of attaching labels, and one that does away with the risk of girdling the graft or tree, is to fasten the label to a staple driven into the tree. The matter of labels is a troublesome one for they will get lost no matter what you do.

Other conveniences of equipment are a small whetstone, a small hammer, matches, and some volatile oil, like citronella, lavender, wintergreen, or other black fly and mosquito repellant. It is almost suicidal to slap a mosquito on the back of your neck with a keen grafting knife in your hand. A supply of parowax and alcohol for the lantern's sake should be remembered.

Technique

If the stocks are vigorous and active, and the scions full of vitality, I doubt if the technique is of chief importance, provided it is ordinarily good. However, a good technique will increase the percentage of success. One should have a variety of methods at command for varying conditions of stocks and scions.

One may come as near 100% success in grafting hickories as one is able and willing to observe all the known factors of success. I think that we can say now that the factors of success in hickory grafting are known. They are a vigorous and active stock, a scion of abundant vitality, coaptation of the freshly cut cambium layers and prevention of desiccation.

The stock and scion have already been considered. How is coaptation best obtained? One of the best methods, one that can be used in all seasons and in most conditions of stock and scion, is the side graft, the one that Mr. Jones uses in his nursery work. That is the best argument for this graft. It is, perhaps, the simplest, and at the same time one of the most difficult, of all grafts. The scion is cut wedge shaped and pushed into a slanting incision in the side of the stock. Mr. Jones's modified cleft graft is only a side graft made in the top of the stock after cutting it off. The difficulty lies chiefly in cutting the scion and the incision in the stock so that the fit will be perfectly true. This requires practice.

The bark slot graft, as Dr. Morris calls it, I have used for several

years. It can be used only during the growing season when the bark will slip. It is very successful, whether put in at the top of a cut off stock, or inserted in the side of a limb or the trunk. It is not convenient to use unless the scion is considerably smaller than the stock. The scion is cut with a scarf, or bevel, on one side only. When the slot is to be made in the top of a cut off stock two vertical cuts are made through the bark, as far apart as the scion is wide, the tongue of bark thus formed is raised slightly at the top, and the point of the scion is inserted, cut surface toward the center of the tree, and pushed down firmly into place. The superfluous part of the tongue of bark is then cut off. By slightly undercutting the edges of the slot, and slightly tapering it toward the bottom, the scion may be wedged, or dovetailed, in place so as to be very firm. It is even possible to dispense with tying, sometimes, but better not to do so.

When the slot is to be made in the side of a limb or trunk the same procedure is followed except that it is necessary before making the slot to remove a notch of bark, at right angles to the axis of the trunk, so as to free the upper end of the tongue of bark.

The bark slot graft is the easiest of all and readily mastered once the grafter learns to shape a true scion. It is much better than the old bark graft where the bark of the stock is forced away from the wood leaving considerable space to be filled or covered.

These two forms of graft, the side graft, of which Mr. Jones's modified cleft graft is only a variation, as before stated, and the bark slot, in its two variations as described, will meet all needs in topworking hickory trees.

Finally, prevention of desiccation of the graft is obtained by waxing. I have found Dr. Morris's method with melted paraffine satisfactory. The addition of raw pine gum, as advocated by Dr. Morris is undoubtedly an advantage under certain conditions, described by him, but I have not yet used it. The melted parowax is applied to the whole graft and wrapping, leaving no cut surface exposed and the whole scion being covered. If the paraffine is at just the right temperature it will spread at a touch, covering the surfaces without danger of scalding. It is much more effective thus applied than if colder and daubed on. The thicker the waxing the more likely to crack and separate. If the paraffine smokes it is too hot. If it does not smoke, and is dexterously applied, I think we can feel safely that it cannot be too hot.

But if applied with a heavy hand it may be too hot even at a temperature so low that it will not spread.

Season for Grafting

According to Dr. Morris nut trees can be grafted successfully in any month of the year. But practically I think that grafting will be limited to that part of the year during which the cambium layer of the stock is active. At other times of the year preservation of the vitality of the scion will be too problematical, it seems to me, even if it is very carefully waxed. However, I may be mistaken. At any rate grafting is not very pleasant work out of doors in very cold weather. The success of bench grafting would be an argument for the success of dormant season grafting out of doors.

After Care

Without thoughtful after care the labor of topworking will almost certainly be lost. There are many ways in which the grafts can be lost but the two commonest are by being choked, or inhibited, by growth from the stock, and by being blown out by the wind. All new growth from the stock must be rigorously prevented. Grafts often make so heavy a growth that, if not blown out by the wind, they will be dragged out by their own weight. Consequently they must often be surported. When the grafts are in, or near, the trunk of the stock, and not too high, the handiest method of support is to cut a sapling of proper length, sharpen the butt, stick this into the ground at the base of the stock, and tie it in two places to the stock. When the grafts are too far out or too high for this method laths or slats or sticks may be tied or nailed to the branches. Support is likely to be even more necessary in the second season when the growth is often astonishing.

Bud worms will sometimes destroy your graft just as it is starting, but they are easily found if looked for. With my conditions the most harm by insects is done by the night feeding beetles, which are particularly exasperating as morning after morning you watch the progress of their destructive work without ever seeing them. Bagging is the only preventive and it pays to use bags when a particular graft is cherished.

Is Topworking Hickories Worth While?

Up to the present time it is the surest and easiest way, practically the only way, of getting good results with the hickories, excepting the pecan. The root systems of the native stocks are well established and push the grafts rapidly. I have had a Siers hybrid grow 11 feet straight up in a season. A Taylor matured several nuts on the third

season's growth. A Terpenny had a crop the fourth year, the Griffin bears annually since its fifth year, the Kirtland and Barnes since the sixth. The Kentucky is a little slower. None of the hybrids have yet borne with me but with others they have borne quite early. We can be sure that the hickories will bear when top worked as soon as the average apple tree. The size of the crop that any topworked hickory tree will bear will depend on the size to which you have been able to grow the tree and the habit of bearing of the particular variety. I think, also, that there is good evidence to show that the size of the tree, the size of the nuts and the size of the crop will depend largely on the amount of care and the amount of plant food that is given the tree.

Two years ago I topworked a number of hickory trees for Mr. Patterson of Wilkes-Barre, one of our members, and Mr. Patterson's foreman put in a few grafts under my observation. This summer I went to Wilkes-Barre to inspect my work. The foreman took me out into a field where he had done a lot of grafting the year before and I found that he had had a little better percentage of success than I had had. He had used the bark slot graft for everything, even when the scions were almost as big as the stocks. Before this I had thought that long experience was necessary for successful grafting. Now I see that if you have good scions, a Morris melter and a half hour of instructions, you will have all the essentials for immediate success. Hickory grafting is easy now. But let no one be contemptuous, for this ease has come only after many years of experiment and countless failures by many men. The former difficulty in grafting the hickory seems now like a mystery. The history of its evolution would make a very pretty story for the nut grower.

NOTES ON MEDIATE AND IMMEDIATE GRAFTING AT ALL TIMES OF THE YEAR

By Dr. R. T. Morris, Connecticut

Any newly described fact which releases information on the subject of tree grafting opens vistas of the new frontier in world agriculture.

Time was when men went from one country to another in search of fresh top soil. That was when they did not know better. It was when their cogs of habit turned their cogs of thought. They were engaged in raising annual plants at a considerable expenditure of time, labor and expense. They committed wastage of soluble plant foods (a variety of sin).

Malthus formulated a famous over-population fear-thought. It had basis in his ignorance of the fact that steam was soon to become a factor in the spreading of food supplies. Furthermore, he seemingly did not know that when old top-soil frontiers had gone to the rear, new frontiers would appear in the sub-soil. The tree digs deeper than the farmer ever plowed.

After Malthus came hunger prophets who were ignorant of coming possibilities of fleet transportation through the air. The caterpillar tractor plunging into the tropical jungle will allow of the production of a practically unlimited food supply. Famine in India, China, and Russia is a social matter and unnecessary. Trees cure famine.

Within the past decade a number of thinkers on one end of the see-saw have written heavily on the over-population question not knowing that they and their birth control ideas were to be tossed into the air by still heavier weight of fact on the other end of the see-saw.

The heavier weight of fact relates to the idea that famine does not belong to tree food regions. It relates to the fact that tree foods can supply all of the essentials of provender for men, livestock and fowls; proteins, starches, fats and vitamines in delicious form. It relates to the fact that tree foods come largely out of the sub-soil without apparent diminution of fertility of the ground. The tree allows top-soil bacteria and surface annual plants to manufacture plant food materials

and then deep roots take these materials to the leaves for elaboration by sun chemistry.

Trees may be grown wherever crops of annual plants may be grown and where annual plants may not be grown profitably. They do not require the service of high cost labor for annual tillage of the soil. For example, four large pecan trees or black walnut trees on an acre of ground without tillage or fertilizer may average a thousand pounds of nut meats annually for a century. How often is the market value and food value of a thousand pounds of nut meats per acre equalled by crops from annual plants which would require from 100 to 200 plowings and harrowings during a hundred years of continuous cultivation, leaving out the question of expensive fertilizers and labor. Large populations live upon dates, olives and figs. For trouble they have to look to religion.

Several centuries were required for the British farmers to raise the wheat crop from six bushels to thirty bushels per acre. Things move faster nowadays. It will not require so long a time to carry tree crops from the seedling phase to the phase of grafted kinds with greater productivity and quality. In the past the successful tree grafter was a specially skilled man. Now almost anybody may graft almost any sort of tree at almost any time of the year.

Aside from grafting the hybridizing of nut trees, like that of cereal grain plants, has become a scientific sport appealing to the play instinct of man. When work becomes play in any field of human activity progress goes by leaps and bounds. The recent advance in tree grafting has amounted almost to a revolution rather than an evolution process. Application of a few new grafting principles of great consequence is now the order of the day. Old established grafting methods frequently ran into failures when dealing with all but a few trees like the common fruit bearing kinds.

The two chief obstacles to successful grafting were desiccation of the graft and fungous or bacterial parasites which entered the land of milk and honey where sap collected in graft wounds. Both of these dangers have now been practically eliminated and it remains for us to extend the season of grafting, carrying it away from a hurried procedure in busy spring weeks.

The chief obstacle to this extension of the grafting season has been the difficulty in finding the right sort of grafting wax or protective material for covering the graft, buds and all, as well as the wound of the stock. For covering the entire graft in order to avoid desiccation

grafting waxes had to be applied in melted form with a brush. They had to be applied in melted form for filling interstices of wounds in which sap might collect and ferment. These waxes had the effect of not retaining their quality under greatly varying conditions of heat, cold and moisture. The paraffin waxes which the author has preferred were inclined to crack and to become separated from the graft and stock in cold weather. Furthermore they would remelt and become useless in the very hot sun of southern latitudes.

Experimentation for several seasons has resulted in the finding that raw pine gum is miscible with the paraffins in almost all proportions because of physical or chemical affinity. This gives to the wax an elasticity and adhesiveness of such degree that we may now graft trees in cold weather. Cohesiveness of molecules of the mixture is such that remelting in the hot sun may not destroy the effectiveness of this protective coating in hot weather.

Since the author has depended upon this mixture he has grafted peaches, apples, hazels and hickories successfully in midwinter as well as in midsummer. Many other kinds of trees have been grafted successfully out of the so-called grafting season but these four kinds which represent two of the "easiest grafters" and two of the "hardest grafters" will suffice for purposes of illustration.

According to old-established idea trees may be grafted successfully only from scions that have been cut when dormant and stored in proper receptacles. This is what we may term "mediate grafting," a considerable length of time intervening between cutting the scions and inserting the grafts. On the other hand what we may call "immediate grafting" is the taking of a scion from one tree and grafting it at once in a tree that is to receive it. Mediate or immediate grafting may both be done at almost any time of the year, winter or summer, spring or autumn.

When preparing the scion for immediate grafting in the spring or early summer it is best to cut off all the leaves and herbaceous growth of the year. We then depend upon latent buds situated in the older wood of the scion. The latter may be one year or several years of age.

In midsummer when top buds have formed we may remove only the leaves, allowing the growth of the year to remain and to serve for grafting material.

In experiments with the apple for example it was found that medi-

ate grafts inserted on July 10th in the latitude of Stamford, Conn., began to burst their buds five or six days later. Immediate grafts inserted at the same time began to burst their buds about fifteen days later from buds of the year and about twenty days later from latent buds in older scion wood.

New shoots from these mediate apple grafts continued to grow as they do in Spring grafting. Immediate apple grafts on the other hand put out about six leaves from each bud and then came to a state of rest with the formation of a new top bud. After about ten days of resting these new top buds again burst forth and grew shoots like those of the mediate grafts.

The philosophy of these phenomena would seem to include the idea that the mediate summer grafts had contained a full supply of pabulum stored up in the cambium layer. The immediate summer grafts, on the other hand, had contained only a partial supply of pabulum, enough to allow them to make six leaves and a top bud. After a few days of resting these shoots with meager larder could then go forward with new food furnished by the whole tree.

Mediate and immediate winter grafts were alike in their method of growth in the spring. This would seem to confirm the idea that character of new growth is dependent upon the relative quality of stored pabulum in the cambium layer.

In experimental work it was noted that both mediate and immediate winter grafts make a slower start in the spring than do the grafts inserted in springtime. This is perhaps due to the formation of a protective corky cell layer over wound surfaces. New granulation tissue would then find some degree of mechanical obstacle in the presence of a corky cell layer at first.

Herbaceous plants allow of grafting. We are familiar with the example of the tomato plant grafted upon the potato plant, furnishing a crop of tomatoes above and potatoes below.

It seemed to the author that the herbaceous growth of trees should be grafted quite as readily. This seems to be not the case. A number of experiments conducted with grafting of the herbaceous growth of trees in advance of lignification has resulted wholly in failure with both soft wood and hard wood trees.

The walnuts carried herbaceous bud grafts and scion grafts for a long time however. These grafts sometimes remained quite green and promising for a period of a month but lignification progressed in the

stock without extending to the scion. Speculation would introduce the idea that lignification relates to a hormone influence proceeding from the leaves of a tree and that the leafless scion does not send forth hormones for stimulating the cells of the scion to the point of furnishing enzymes for wood building.

Perhaps the most interesting part of new tree work relates to experiments which are failures. Negative testimony is like the minor key in music. There are many men who care to do only things that "cannot be done." These are the ones who have made our progress in almost every field of human activity.

STOCKS FOR HICKORIES

Willard G. Bixby, Long Island

Mr. Bixby: The sheets which I am distributing to you contain tables to which I shall refer during this talk. But first I will give a little foreword regarding the trees. The trees enumerated in the tables shown were nearly all given me by Mr. Henry Hicks of Isaac Hicks & Son, Westbury, Long Island, and were taken to Baldwin and set out in the fall, practically the entire roots being saved and later the trees severely cut back. They were transplanted without loss except in the case of the shagbark, and those lost were all under-sized trees. All of the hickories were of one age, but those lost were ones which had not made normal growth and had they been discarded in the beginning there would have been no loss whatever in the transplanting of 300 or 400 trees. Later, in the spring of 1924, I found some loose bark pignut (Carya ovalis) seedlings on a farm not far away from my place, and these were also transplanted; but they were too small to graft this year. These experiments in grafting, made during 1923 and 1924, have shown us some new things. With some of the walnuts we had 100 per cent success. With the hickories there was not 100 per cent success, but that was due to the fact that we were putting scions on stocks that were not congenial in many instances. You will notice the results as shown on the tables.

1923 Grafting

G—Grafts Set C—Successful Catches

	Shagbark		Mockernut		Pignut		Pecan		Bitternut		Total		
	G	C	G	C	G	C	G	C	G	C	G	C	%
Barnes 6	6		3	3	3	3	3	3	3	3	18	18	100.0%
Brooks			5	0	4	2	5	1	5	2	19	5	21.0%
Clark 5	1		5	0	5	2	5	1	5	2	25	6	24.0%
Fairbanks									27	17	27	17	59.3%
Gobble 1	0		1	1	1	1	1	1	1	1	5	4	80.0%
Griffin 1	1		1	1	1	0	1	0	1	1	5	3	60.0%
Hales			5	3	4	1	5	4	5	5	19	13	52.5%
Kentucky 5	4		3	1	5	4	5	4	5	1	23	14	61.0%
Kirtland			3	1	3	2	3	2	3	2	12	7	58.4%
Laney									6	4	6	4	66.7%
Long Beach ...4	3		3	2	4	1	4	2	3	1	18	9	50.0%
Manahan 5	1		5	1	6	2	5	1	5	1	26	6	24.2%
Siers									5	5	5	5	100.0%
Stanley			3	3	3	2			3	3	9	8	89.0%
Taylor			4	3	3	3	4	3	4	3	15	12	80.0%
Vest 5	1		5	0	5	1	5	2	5	1	25	5	20.0%
Weiker			5	1	5	2			5	1	15	4	26.8%
	32	17	51	20	52	26	46	24	91	53	272	140	
	53.1%		29.2%		50.0%		47.0%		59.3%		51.5%		

An inspection of the 1923 grafts made August 21, 1924 showed the following number growing: on shagbark 14, on mockernut 6, on pignut 26, on pecan 24, and on bitternut 46, the only place where there was any material difference being in the case of the mockernut where nearly three-quarters of the number of grafts growing last summer failed to grow this spring, in fact all varieties failed to grow excepting three, the Barnes, Gobble and Long Beach, all three of which I suspect from other evidence, have mockernut parentage. In the case of those on pignut and pecan stocks there was no loss from 1923 and in some instances at least of those on shagbark and bitternut stocks the loss was due to outside causes, such as being broken off.

1924 Grafting

G—Grafts Set C—Successful Catches

	Shag-bark		Mocker-nut		Pignut		Pecan		Bitter-nut		Total		
	G	C	G	C	G	C	G	C	G	C	G	C	%
Barnes			8	7	10	4					18	11	61.0%
Beaver			5	1							5	1	20.0%
Brooks			11	8	10	5					21	13	61.9%
Clark	6	0	8	0	5	0	5	1			24	1	4.6%
Fairbanks			5	3							5	3	60.0%
Greenbay			5	0							5	0	0.0%
Hales			5	1							5	1	20.0%
Kentucky			5	2	4	2					9	4	44.5%
Kirtland			5	5	4	3					9	8	88.8%
Laney			5	3	5	2					10	5	50.0%
Manahan			6	2							6	2	33.3%
Mosnat No. 5			7	1							7	1	14.7%
Mosnat No. 6			10	6							10	6	60.0%
Siers			5	4							5	4	80.0%
Stanley			12	1							12	1	8.3%
Vest	10	3	15	5	16	5	10	3	12	3	63	19	34.2%
Weiker			5	3							5	3	60.0%
	16	3	122	52	54	21	15	4	12	3	219	83	
	18.7%		42.6%		38.9%		26.7%		25.0%		37.9%		

In 1923, it was very evident that the Barnes was the only variety showing 100 per cent success on every stock. That was not repeated in 1924, but it still showed a high percentage of success.

From the comparatively modest percentage of catches 51.5% on the average in 1923 and 37.9% in 1924, one might hastily conclude that the grafting was not skillfully done or that the grafts did not have proper attention afterward, but as noted above the grafting was done by Dr. Deming, whom I regard as one of the most skillful men that we have, and as the work on walnuts done at the same time showed 100% success with a number of varieties, I think any question as to the skill with which the work was done and the care the grafted trees had afterwards can be dismissed.

It is to be regretted that the number of scions at hand was not

sufficient to repeat exactly the experiments of 1923 as well as to follow out the points suggested by the 1923 work, but as there was not enough for both, the latter was done.

The 100% success of catches of the Barnes in 1923 was not repeated in 1924; but the high per cent of catches on the mockernut, (7 out of 8 in 1924), is gratifying in view of the few varieties that we have that have shown adaptability to that stock. As the Barnes is one of our good varieties and there is such a wide section of the country where the mockernut is the prevailing hickory, it is believed this behavior of the Barnes will prove a valuable addition to our knowledge in top-working the hickory.

No variety as strikingly adapted for use on the pignut has appeared, but there are a number that have shown fair adaptability.

The varieties most desirable for top-working various species of hickories as suggested by this work supplemented by other observations of the writer, would be as follows:

Shagbark—Most varieties.
Mockernut—Barnes.
Pignut—Brooks, Kentucky, Taylor, Kirtland.
Bitternut—Beaver, Fairbanks, Laney, Siers.

It is useful to know that the Barnes is the only one especially successful on the Mockernut. By the spring of 1924, all grafts on mockernut had died except the Barnes, the Gobble and the Long Beach, and each of these is thought to have mockernut parentage.

In the cases of the pignut and the pecan stocks, all of the grafts successful in 1923 were still living in 1924. With the shagbark and bitternut most lived. As to pecans there is not much to be said; pecan varieties would usually be used for the topworking here.

The results of a few grafts set in 1924 on *Carya ovalis* and on shellbark seedlings which were 100% failures, are not noted, as the shellbarks were, in the judgment of the writer, too small for the purpose, and the *Carya ovalis* had been set out in the spring of 1924 but a few weeks before the grafting was done. In other words the latter had not become sufficiently established to make good stocks, and the former were not large enough. In each case there was not sufficient vitality available to expect success.

This brings out one point which has impressed me strongly; that is the need of having vigorous stocks if they are to be grafted or transplanted successfully. I feel that this point cannot be too strongly

emphasized. If a stock either from youthfulness or inherent lack of vigor is not rapid growing it is almost useless to try to graft it or transplant it until it does show the needed vigor.

As to stocks to grow in the nursery with the idea of grafting them later, the two commonly used, the bitternut for the bitternut hybrids and the pecan for others, there is little further to be recommended at this time, although for some varieties, notably the Vest, a stock better adapted to it than any we now have is earnestly to be desired.

The President: Are there any questions on these three papers on hickory grafting?

Mr. Reed: There are two points in regard to propagation which I believe should be mentioned; one is that these various methods that have been discussed make it possible to propagate successfully during a great portion of the year. By beginning early in spring with the dormant graft, and continuing throughout the summer, these methods can be made to follow one another so that if one fails still another can be used. These methods greatly prolong the season, and when it is not convenient to propagate at one period by the method proper to use at that time another can be employed at a different season.

The other point is that we are constantly learning more in regard to the influence of stock upon scions. For example, hickories on pecans seem satisfactory while the reverse is at least doubtful. Mr. Jones finds that *sieboldiana* is not a good stock for *regia*. We all find *nigra* apparently satisfactory as a stock for any species of *Juglans*. These conspicuous differences of influence of various species upon scions suggest the possibility of less, but perhaps quite as important, difference of varieties. It is one of the newer phases of study and experimentation which should be considered by all and reported upon to this association.

The Secretary: At my place the Vest, used in top-working large shagbark hickories, has been very successful. I do not know any that have been more successful or that grow more rapidly than it does on the shagbark hickory.

Dr. Morris: The Marquardt is successful at my place.

Mr. O'Connor: I do not know why we have not had success with paraffine in a single instance. In grafting fruit trees I had excellent results. I thought that if this could be done on fruit trees why not on nut trees? But I am going to try with the hickory again. I am going

to be more careful in selecting good, strong stock for that purpose, and I think in that way we should have better success.

Dr. Morris: Did you not perhaps cover the buds of your hickory grafts too thickly with melted grafting wax? Might not that account for your failure? Hickory buds will burst their way through almost any thickness of grafting wax, but when the paraffines are used without pine gum admixture the paraffine over the buds is particularly apt to crack and to allow the graft to dry out.

Mr. O'Connor: I did not cover the hickory grafts with melted grafting wax at all; I simply put them in like apple grafts with ordinary grafting wax.

Dr. Morris: Practically all hickory grafts will fail under such circumstances, but practically all hickory grafts will catch if they are covered with melted grafting wax of the right sort, provided that the scions and stock are also of the right sort.

The Secretary: May we now have the President's address?

The President: Before I begin I wish to call to your attention this pamphlet regarding the fifth Mid-West Horticultural Exposition, to be held in the Hippodrome, Waterloo, Iowa, November 11 to 16, 1924. It will be under the auspices of the Iowa State Horticultural Society, co-operating with its afflicted societies and the Greater Waterloo Association. The exposition will cover the Mid-West territory, from Pittsburgh to Denver. I wish especially to mention the printed list of premiums on page 27. Mr. S. W. Snyder, Center Point, is superintendent of this department. Cash premiums in Department b-Nuts, amount to $289. In addition there will be a grand sweepstakes, a trophy cup, donated by a member of the Northern Nut Growers' Association, for the exhibitor winning the greatest number of points. Anyone interested could write to the secretary, Mr. R. S. Herrick, State House, Des Moines, for a printed premium list. If any members of our Association have pet nuts of a variety which they would like pushed to the front now is the chance. Snyder Brothers are offering special premiums for new nuts unnamed and unpropagated.

The object of this association, as defined in its constitution, is "the promotion of interest in nut-bearing plants, their products and their culture," and as its name implies, in the northern part of this country. Without going into detail it seems to me that we have achieved the object of our association, at least to the extent of making practi-

cal use of our accumulated knowledge. Public interest has been aroused, which may become stale. Articles have appeared in magazines and newspapers from time to time on subjects relating to nut culture. We are also on a continual lookout for new varieties, and those of our members skilled in the art are constantly improving and working out new methods of grafting and budding, particularly as evidenced by Dr. Morris' work entitled "Nut Growing." We know approximately how soon a grafted nut tree, especially the black walnut, will begin to bear. At Mr. Jones' Nursery, Lancaster, Pa., an Ohio black walnut tree in the nursery row bore a cluster of seven nuts 17 months after the graft was placed. Mr. J. W. Wilkinson, of Rockport, Ind., has demonstrated that grafted northern pecan trees bear early and abundantly for their size.

We have given advice conservatively in reply to all inquiries relative to nut-bearing plants, perhaps too much so. Much honor and credit is due to certain members of our association for their untiring work and efforts in its behalf. It is not necessary to mention names as I am sure most of you present know to whom I refer. Our annual reports testify to their splendid work.

From this time forward I believe we should adopt the policy of boldly advocating the planting of orchards of nut trees. The intending planter will decide for himself what variety he will plant, and as a guide he should judge from the wild varieties growing in his vicinity. By so doing he cannot go very far astray in what will be to him a new venture. Of course certain varieties will be restricted to certain limited areas. This applies particularly to the introduced varieties, as distinguished from the native nut-bearing trees.

The black walnut has a wider range than any of the other nut trees. Travel wheresoever you will about the country and you will observe wild black walnut trees growing almost on every farm. The planting of the Persian, or English walnut, as it is more generally known, has had more of a popular appeal, perhaps from the fact that we are accustomed to seeing clean, smooth nuts of uniform size of that variety in almost every grocery store, the kernels of which may be extracted without great effort. The black walnut, on the other hand, has been tolerated as a sort of poor relation, and has been given no particular attention, because we have been used to seeing it around. It has not been made to do its share of contributing towards its keep. Our earliest recollections of it bring to mind bruised fingers as a re-

sult of our endeavors to crack the nuts and the tedious work of manipulating a darning needle to extract the kernels, which we usually picked to pieces in the process. We now know that we simply did not have the right kind of black walnuts. We should put our accumulated knowledge to practical use to urge on every occasion the planting of nut orchards, especially of approved varieties of the black walnut. This I understand is what the United States Department of Agriculture is advocating, and we should co-operate all we can with the department in that recommendation.

It will, no doubt, be urged that sufficient grafted black walnut trees are not available for orchard planting on a large scale. This, no doubt, is true, but on many farms there are wild black walnut trees of a size suitable for grafting or top-working. Grafting wood may be obtained in larger quantities than the grafted trees. Those of our members skilled in the art have not been selfish in imparting their knowledge to others and are always ready and willing to instruct others in the art. Most owners of these trees would only be too glad to substitute profitable tops for their trees in lieu of their unprofitable ones.

I believe that at all our meetings we should have practical demonstrations in budding and grafting, as this will tend to arouse the interest of the uninitiated and will spur the initiated to greater perfection.

During the past year there has been a discussion relative to the calling of the black walnut by some other name. Personally I believe we should not attempt the change. The public will not understand and it will take them a long time to become educated to the change. Valuable time will be consumed in picking out a new name. Let us take the name as we find it. Properly handled, after the husks are removed, the walnuts will not be as black as they are painted, and besides, we do not eat the shell anyhow. The quality of the kernel will make its appeal. The trouble with all of us has been that too much attention has been given to the looks, rather than the quality, of our food stuffs. Quality has been sacrificed for looks. Various illustrations of this come to mind with all of us.

I believe success will attend the planting of black walnut orchards. This will encourage others to follow with orchards of other nut-bearing trees. Orchards of all kinds of fruit trees are being planted each year and the planters are content to wait until the trees are

large enough in order to reap the benefits thereof. But somehow the impression prevails in the minds of many people that a nut tree should show results and yield profits soon after it is planted. In recommending to a lady of means that she should plant, as shade trees, northern pecans she promptly wanted to know how many bushels of nuts she would get off of the trees the next year.

Perhaps we place too much importance on selecting just the right spot and soil in which to plant a nut tree and thus cause the intending planter to be too timid in making a start. Those who know anything about trees know pretty well where it is not advisable to plant trees, especially those with a long tap-root. They can judge fairly well from the wild trees of the same variety growing round about.

As evidence of what a nut tree will do, those of you who have visited Devil's Den in Gettysburg Battle Field, have perhaps noticed a butternut tree, now quite old, growing out of the top of the cleft in a huge rock, having sent its roots down to the adjoining soil for nourishment. This tree has borne nuts even in its adverse situation.

For the benefit of those interested in the northern pecan, I wish to record the fact that a seedling pecan tree is growing in Clermont County, Ohio, on upland, not far from the eastern boundary line of Hamilton County, about five miles north of the Ohio River. The nut from which the tree grew was brought from Rockport, Indiana, and planted about forty-one years ago. The tree is quite large and bears nuts comparable with the wild seedling nuts that may be obtained from the Rockport district. If a seedling does this, you may readily see what a grafted tree will do.

The President: We will now ask Prof. Collins for his address.

THE SEARCH FOR BLIGHT-RESISTING CHESTNUT SPROUTS*

Prof. J. Franklin Collins, Rhode Island

The chestnut blight has now been with us for more than twenty years and has destroyed practically all the chestnut trees of the northeastern part of the country. It has spread in all directions from its original center in the immediate vicinity of New York City until it has reached the limits of the native chestnut growth in the northeast and north, and is steadily approaching its limits in the west and south. The disease, a native of China and apparently imported into this country on some Japanese or other oriental chestnut, found a more susceptible host in our native chestnut and so became a virulent parasite on this new host. It was not until 1904 that general attention was attracted to the disease. By that time it had obtained a strong foothold on the chestnuts of southeastern New York (particularly the western end of Long Island), in southwestern Connecticut, and in northern New Jersey.

All of you are more or less familiar with the efforts made in Pennsylvania, New York, and elsewhere in the northeast, in co-operation with the federal government, to control the disease. These efforts are now an old story to most of you and there is no need of repeating it at this time.

Early in the fight against the blight the attention of many of us was directed to locating possible immune or resistant species, varieties, or individuals. The search for resistant native individuals and the accompanying experiments in crossing and grafting various species and varieties has been kept up ever since. Foreign explorers have constantly been on the lookout, with more or less success, for chestnuts in other countries that might be resistant to the blight. It has long been known that most forms of the Japanese chestnut (*C. crenata*) were in general highly resistant to the blight. Later it was found that the more recently introduced Chinese chestnut (*C. mollissima*) was also

*Note—"Blight-resisting" as used in this paper should be interpreted as a slower death of the host than in former years, whether or not the result of increased resistance to the parasite on the part of the host, or to decreased virulence of the parasite, or to both factors combined.

quite resistant, although both the Japanese and the Chinese were far from being immune. Quite recently Mr. Rock, explorer for the U. S. Department of Agriculture, has brought a new chestnut from southern China for experimental purposes. Notwithstanding newspaper reports to the contrary the possibilities of this chestnut in this country apparently are unknown at the present time. Nobody seems to know if it will stand our climate, resist the blight, produce worthwhile timber or fruit; nor is its name known, according to late advices that have reached me.

Some years ago the late Dr. Van Fleet made numerous crosses between the Japanese and the American chestnuts, the Chinquapin, and other species and varieties. Personally, I have not been in very close touch with Dr. Van Fleet's experiments. Doubtless some of you know more about them than I do. Regarding these I will only say at this time that the work begun by Dr. Van Fleet is being continued by the Federal Bureau of Plant Industry, with Mr. G. F. Gravatt in direct charge of the work so far as the Office of Investigations in Forest Pathology is concerned. Mr. Gravatt is also testing out the value of scions taken from seemingly resistant native trees when grafted on resistant stocks.

Some years after the blight had destroyed most of the chestnut trees in the northeastern states we kept getting reports from various localities to the effect that the blight was apparently dying out. Many of these reports came from sources that made us doubt their value, but others came from more reliable sources. We have had opportunity to investigate a number of these reports and have usually found that the statement that the blight was dying out was, in a sense, strictly true, the reason being that the chestnut trees were entirely dead, except for sprouts. This fact naturally prevented the disease from showing us as much as in former years.

Some twelve years ago I noticed in Pennsylvania a sprout of an American chestnut about an inch in diameter which had a typical hypertrophy of the disease, apparently completely girdling the sprout at its base; also a girdling lesion farther up on the stem. The hypertrophy was such a pronounced one and in other respects such a typical example of the disease that I photographed it. A few years later I was surprised to observe that this sprout had increased to more than three times its former diameter and that the two diseased areas just mentioned apparently had disappeared—at least they were no longer

in evidence except as rough-barked areas. To make a long story short this sprout is still alive and has increased in size and height each year. Although now (1924) it is considerably branched and makes a small bushy tree it is badly diseased in numerous places and is only partially alive, but the dead portions have not resulted from some half dozen of the original disease lesions (apparently girdles), but from later infections. The very fact that a sprout should have lived for more than twelve years in the center of one of the most badly diseased areas known to the writer seems at least to suggest the possibility that future chestnut sprouts may yet grow in spite of the disease and persist—at least in a shrubbery form if not as a tree.

The sprout to which I have just called attention is not an isolated case, but merely one of the most pronounced that I know about. In a careful survey in July (1924) of the region immediately surrounding the sprout just mentioned two or three other notable, but less pronounced, cases of a similar sort were discovered. In two cases fine looking branched sprouts some twenty feet high with healthy-looking foliage were noted. Both were diseased but the disease seemed not to be very conspicuous or virulent. In a recent survey of woodland in Rhode Island (July, 1924) much healthy foliage was observed and several large sprouts were found on which the disease (although present) seemed to be doing little damage when compared with its former virulence in the same general region.

I call attention to these cases primarily to acquaint you with the results of our latest observations on what seems to me to be cases of gradually developing resistance in some of the remaining sprouts. In all my intensive work on the blight between 1907 and 1913 I cannot now recall a single instance where a chestnut sprout in a disease-ridden area ever reached a diameter of an inch or thereabouts before its existence was cut short by the blight; and yet today—a dozen years later —we are finding quite a number of living sprouts over two inches in diameter, and a few that are three, four, and even up to seven inches in diameter. Last Friday, August 29, I heard of a small chestnut tree in New Jersey that bore a few burs last year and which has a dozen or more this year. If the nuts mature we hope to get some of them to propagate. Last Sunday, August 31, I saw a three inch sprout in Connecticut that had had a few burs on it. I would be glad to learn of any cases of this sort that may come to your attention.

You are all thinking men and women and all of you have had exper-

iences with diseased trees of some sort, many of you with very serious diseases, and some of you I know have had a wide experience with the chestnut blight, so you can draw your own conclusions as to the significance of the facts that I have stated.

As to the state laws for transporting material from one state to another I am not posted, but I believe that we can be advised by writing to the government at Washington.

Dr. Morris: We do not know whether the Washington government will sterilize those scions and send them out for us, but there should be some way of sending from one state to another. *

It seems to me that in all probability, the vital energy of the protoplasm of the endothia is diminishing. Quality, flavor, or anything you please, is bound up with certain vitality, and that diminishes and finally will cease. That is the reason for the endothia growing less now.

Prof. Collins: My point was perhaps not exactly that. I meant that the result is that, with the average cases, we are now getting chestnuts not so quickly destroyed. The explanation may be exactly what you have stated.

Dr. Morris: There are two factors to be considered. First, the running down of the vital energy of the protoplasm; and second, in the factors which affect the vital energy of the plant.

Prof. Collins: In the paper I have just read there was mentioned the apparent number of trees in various parts of the country which are very slowly dying from the blight, and some which have resisted it entirely, so far; but that was not the point I desired to emphasize. There are some around New York City which are still growing, and Dr. Graves could tell us of this.

Mr. O'Connor: Would it be desirable to take out an old tree where there are new sprouts? One tree on Mr. Littlepage's place in Maryland has a number of sprouts coming up. I suggested that if

*Decision From the U. S. Department of Agriculture, Washington, D. C.

In a letter of later date, addressed to Mr. C. A. Reed, Dr. B. T. Galloway, of the U. S. Dept. of Agr., wrote regarding the matter of distributing Merribrooke chestnut scions, as follows:

"I have talked with Mr. Stevenson, of the Federal Horticultural Board, regarding this matter, and he says that, while there is no federal quarantine covering the chestnuts, as a matter of policy we have not been letting any chestnuts or scions go through our hands into the non-blight regions. Mr. Stevenson says that Dr. Morris himself might be able to carry out the plan he suggests by dealing direct with some of the state institutions in non-blight regions, selecting states that have no quarantine against chestnuts."

we could get people together and clean the woods up we could dig up the old trees and only leave the blight-resistant ones.

Prof. Collins: That is near Bell Station where we do our experimental work. We found one place infected. I cleaned it out and we have not seen anything of the disease since.

Mr. Bixby: Some five or six years ago I sent a number of chestnuts to Warren, New Hampshire, which is outside of the blight district. I did not know then much about the blight. They grew for several years and it was not until one year ago that the trees were found with blight. I got the party to cut them down. How long must I wait before it is safe to send other trees there? I believe they will grow there and bear, but we do not want to get them affected with the blight.

Prof. Collins: I do not know that anybody could answer that. Apparently we have waited 20 years and are still unsafe. It is a case of experimentation.

Mr. Kains: As to the hybrids of Dr. Van Fleet and Dr. Morris, in the spring of 1923 I planted 10, and there are only four alive now. They were affected by blight and killed. They were rather large trees when planted, and I think for that reason more susceptible. We had the idea from the nursery that they would be more likely to withstand the disease than would the American sweet chestnut. Have you any reports as to the way these hybrids behave?

Mr. Reed: As to Dr. Van Fleet's hybrids, so far as we know they are all going with the blight. The collection in Washington is practically gone. We are still caring for them and doing what we can but the prospect is not at all good. We get reports of these distributed around the country, but in no case have we had a report indicating that the Van Fleet hybrids were at all resistant.

Prof. Collins: I will now read my paper on

PROTECTION OF WOUNDS IN NUT TREES

I have been asked to discuss briefly the handling of wood decay in top-worked nut trees. I am not sure that I know very much about the latest methods employed in this type of work. Personally I have had no practical experience with it. I understand, however, that nut trees are top-worked by cutting off limbs and inserting one or more scions. I am informed that limbs as large as six inches or more

in diameter have been cut for this purpose, particularly on pecan trees in the South, and that decay has started at the top of these stubs after the scions have become established, resulting in a pocket of decay. I assume that it is about such places as these that you want me to say something. Such conditions, whatever their origin, call for straight tree surgery methods. My work on tree surgery has been almost entirely with shade trees and chestnuts, and only to a very limited extent on other nut trees.

The general methods of handling decay are essentially the same on all trees, as also are the fundamental principles underlying the same, whether on nut or shade trees. I must admit I do not know just what methods are being employed by nut growers at the present time to counteract such decay in top-worked trees, so my suggestions may include nothing with which you are unfamiliar. Again, they may include some methods that you have already tried and found wanting so far as nut trees are concerned.

As a *prevention* of decay my suggestions, based on my own shade tree experience, would be:

(1) Avoid cutting large limbs when smaller ones are available and will serve the purpose just as well or better.

(2) Keep the scars thoroughly and continuously covered with some good waterproof and antiseptic material so as to prevent infection of any part of the cut surfaces.

(3) Always make the cut somewhat slanting so that rain water will readily run off, and insert the scions preferably at the upper extremity of the cut. Such an oblique cut normally heals quicker and better on shade trees than a transverse cut, particularly if a vigorous young sprout is left at the peak of the cut. I am quite certain the same statement will hold true with scions of nut trees placed at the peak of the oblique cut.

After decay *has started,* I would suggest—

(1) Cut out all the decayed woody matter, preferably from one side, so that a free and easy drainage of the wound may result. If necessary, when several scions have been placed around the stub, sacrifice one of the grafts and make a rather long oblique cut or groove from which all decayed matter has been removed. Use shellac, liquid grafting wax or melted paraffine over the cut bark, cambium and adjoining sapwood immediately after the final cut is made.

(2) Cover the entire wound with some good preparation to keep out disease germs and water. Preferably use for a covering such materials as will be more or less permanent and which have been found by practical experience to be least injurious and most effective on the particular nut tree that you are treating.

(3) Keep the wound thoroughly painted or covered at all times until it is completely sealed over by a new growth of callus.

(4) If the top-working was originally done in such a manner that the removal of all the decay results in a cavity that cannot be properly drained, it is advisable to fill the cavity with some waterproofing and antiseptic material in order to prevent it holding water and also to assist the cambium in covering the wound. The cavity must first be treated in accordance with approved tree surgery practices. In shade tree work, quite a variety of substances have been used to fill cavities with more or less success; e. g., wood blocks and strips, asphalt and sawdust, asphalt and sand, clear coal tar, clear asphalt, elastic cement, magnesian cement, Roman (or Portland) cement, etc. Of these only two—wooden blocks and Portland cement, have been in general use more than a few years. Blocks of wood were used in France to fill cavities more than 60 years ago, and in this country to some extent about 50 years ago. Later, Portland cement was used in preference to wood for fillings, probably mainly because it was more easily handled. To us of the present generation, Portland cement in combination with sand is the one material that seems to have been in general use sufficiently long to allow us to draw any seemingly reliable conclusion as to its real merits.

For the personal use of the average orchardist, Portland cement is one of the last in the list mentioned above that I would recommend. According to a few reports that have reached me, wooden blocks and tar proved to be fairly satisfactory half a century ago, and strips of wood embedded in some flexible and antiseptic material, are proving very satisfactory today. An excellent preparation to use between the strips of wood, containing asphalt and asbestos, can be readily bought on the market, and it has the advantage of being mixed ready for use. For cavities with horizontal openings that will hold semi-fluid substances, clear asphalt or gas-house (coal) tar may answer all purposes. For cavities with oblique or vertical openings, or for those on the underside of a limb, probably some of the magnesian cements, which readily adhere to wood, will be found more satisfactory when properly mixed and applied.

Although I have said more about filling cavities than of other phases of the work, I do not wish the impression to go forth that I recommend such work except as a last resort, so to speak. The one thing that I do most emphatically recommend above all others is the prevention of decay so far as possible by practices that are less likely to allow decay-producing organisms to gain entrance in the first place, or at any other time.

The President: Does anyone care to discuss this paper?

Mr. Kains: Mr. President: During the last five years, I have planted several hundred nut trees, including the English walnut, black walnut, the heartnut, pecan (northern ones) and some hybrid hickories. I have noticed that in this nursery stock there has been a good deal of dying-out of the original stock where the trees had been grafted, and where the scion had not covered over. In some of those cases decay has set in, and the trees have died before they could be attended to or have been broken down by the wind. The point is, I think it a mistake for nurserymen to use as large stocks as they have been using in many of these cases, because the stump of the stock is too large for the slowly growing scions to cover over quickly enough. My experience in the planting of fruit trees has been uniformly successful with smaller stocks (that is, trees smaller than I have been able to buy for nut trees) with peaches one year from the bud and with apples not more than two years; with berries and stone fruits, not more than two years. In every case, with the fruit trees, one year stocks have given me better results. First, because they healed over more quickly, and second, because I could cut to better advantage in the trees. In no case have I been able to get nut trees as small as I can apples and peaches. I believe that with the smaller trees amateurs will have better success. I bring this matter to the attention of those men who are devoting their lives to the propagation of nut trees.

The Secretary: The subject of transplanting nut trees was treated fully by Mr. Bixby in his paper this morning and will be treated by Mr. Hicks this afternoon in his address on the subject. Mr. Hicks will give a lecture, illustrated with slides, showing how the larger nut trees may be successfully transplanted.

Dr. Morris: Mr. Kains' thought was that there was a good deal of difficulty from using stocks that were too large. Paraffine will keep them safe from microbes.

Mr. Kains: We had difficulty from the drying of the scions.

Dr. Morris: I find that if raw pine gum is put in it prevents the paraffine from cracking.

Mr. O'Connor: In regard to wounds on the trees I find that creosote makes a very good antiseptic. I use coal tar and creosote, mixed to a consistency of cream. I have used Portland cement but I

treated with creosote first. In some cases I used bichloride of mercury.

Mr. Reed: It seems to be the experience in the South that, so far as the amateur is concerned, he gets better results with the pecans by planting trees of from three to five feet. Trees smaller than that are regarded as dwarfed; but the man who is in a position to exercise greater care could get quicker results from buying the large-sized trees. Yet it requires more care in transplanting, more fertilizer, and more attention.

Mr. Reed: I wish to make the motion that the chair name a nominating committee at this time.

The President: Is that agreed? All right; then I name Mr. O'Connor for chairman, Mr. Reed, Mr. Olcott, Mr. Bartlett and Mr. Hershey on the committee. Are those names acceptable? (Vote shows unanimous acceptance).

The President: The convention will adjourn until two o'clock.

First Day—Afternoon Session

Meeting called to order by the President.

The Secretary: I will read a communication from Mr. Snyder, of Center Point, Iowa. But first I would like to explain that when the President in mentioning the Horticultural Exposition at Waterloo, spoke of a sweepstakes cup from a member of the N. N. G. A. for the greatest number of points won in the nut exhibition of which Mr. Snyder has charge he did not state that he himself was the member who gave the cup.

A HARANGUE ON THE NUT SITUATION IN IOWA

By S. W. Snyder, Iowa

Previous to the organization of the Mid-West Horticultural Exposition the Iowa State Horticultural Society had given but little attention to the nut question. But along with the exposition came a demand for a nut department, which resulted in the writer being appointed superintendent and given authority to prepare a limited premium list.

This resulted in bringing out a number of new and unnamed varieties of nuts and created some enthusiasm. When it came time to prepare for the second exposition, authority was given to greatly

increase the premium list, which resulted in bringing out more new varieties and created a wonderful lot of enthusiasm.

When it came time to prepare for the third exposition a list was adopted calling for $138.00 in cash premiums, which resulted in bringing out such a large exhibit of choice nuts that when we came to make preparation for the fourth exposition the premium list was increased to a total of $181.50. This brought out so many fine nuts that it became a common thing to hear the remark, among the visitors that it was the most important department in the exposition.

For the coming exposition, to be held next November, the premium list as adopted calls for $280.00 in cash premiums, and while I am no prophet I am going to predict that it will result in bringing together the largest nut exhibit ever collected under one roof in the United States.

At our last exposition held in Council Bluffs, some of the directors of our state fair observed that the nut department was attracting much attention and was bringing a good many visitors to the exposition. They decided that they must have a nut premium list for the state fair and requested me to make up a list covering the nut subject as strictly applied to the State of Iowa. This I did and am attaching the list hereto. Although our state fair comes off in the month of August, and no nuts are available for exhibit, except such as happen to be kept over from the previous year's crop, yet it brought out at our 1923 fair the largest and best exhibit of nuts that has ever been shown within this state, not excepting the exhibits of the exposition. The board of directors were so well pleased with the interest manifested in the nut department that they are continuing the list for this year's fair and doubtless it will become a permanent feature of future fairs of this state.

So much publicity and attention has been given the nut question within our state that it has resulted in bringing to light several new varieties that we think should be propagated before the original trees may have been destroyed.

The horticultural department of our Iowa State Agricultural College is now taking an active interest in the nut question and has assigned one of the professors to the job of collecting information about and taking pictures of, the best known nut trees within the state.

If they follow up the nut subject with as much vim and energy as they have other phases of horticulture we may look for something in the nut line in the next few years that will be worth while.

The native nut situation might well be summed up by saying that we have so many good walnuts, butternuts, hazels, pecans, hickories, and hybrids of the two last named species, that we could banish all foreigners and still have plenty left to supply every need.

The crop of nuts for this season is fairly good; some trees have none, others a light crop, and some varieties are carrying a heavy load.

Of introduced nuts some are proving to be hardy and fruitful, but in my judgment they are all lacking in eating quality as compared with our own native nuts, unless I should except the filbert which has not yet proven that it will bear profitable crops in this climate.

In closing I want to give just one instance of the great interest that has been aroused for nut growing within this state.

A certain little city of less than two thousand inhabitants happens to own thirty acres of land that is suitable for the growth of timber. The citizens propose to plant the entire tract to nut bearing trees and bushes, and eventually make it a free park in which the children of the village may be turned loose to gather the nuts.

Just imagine, if you can, how the enthusiasm of the boys who may be fortunate enough to live in that little city, will more than bubble over as the nut gathering season approaches. I hope to be able to assist those people in their laudible enterprise and wish I may live to see it develop into the greatest thing of its kind in the United States.

The President: Dr. Brooks, will you kindly give the Vice-President's report from West Virginia, preceding your paper?

Dr. Brooks: I have no special report to give as Vice-President of the association from West Virginia. I might say, perhaps, that the West Virginia station is in a land of hills and dales. Our latitude is from 200 to 5,000 feet above the level of the sea, and our average elevation is 1,500 feet. From our excellent position we can look down 600 feet or so upon the Ohio. Our land contains many species of trees, including nut trees. Among these there is one species of beech, two of hazel, two of chestnut, six of hickory, two of walnuts and fifteen of oaks. Fortunately, the chestnut blight has not swept the entire state. The chestnut has been in the past and is still our most popular tree. There are areas where tons of chestnuts are still put on the market every year. The people are still thinking more and more of some plant that might take its place; they are considering the shagbark hickory and the black walnut. I predict that in the future there will be more planting of hazel nuts, black walnuts and shagbark hickories in this state. The prospect there is promising.

SOME OF THE MORE IMPORTANT INSECTS ATTACKING NORTHERN NUTS

By Fred E. Brooks

Associate Entomologist U. S. Department of Agriculture

The prevalence of insect pests need not be regarded as an alarming obstacle to nut growing in the North, and yet there are numerous species of insects which are capable of destroying our nut crops. On the whole I presume there are fewer insects that attack nuts in this country than commonly attack apples, but apple growers are not limited in planting nor prevented from making profits on account of insect depredations. Neither should the probability of more or less insect injury discourage the would-be planter of nut trees.

The presence of an insect in any locality may mean, among other considerations, that the soil, and climatic conditions of that locality are favorable to the plant upon which the insect feeds. We may be sure that wherever the Baltimore butterfly is abundant, nearby is a congenial spot where the turtle's-head, the food plant of the butterfly, flourishes. Just so, in localities where there are many chestnut weevils we may expect to find chestnut trees thriving and fruiting generously. The same is true of the associations of many other insects and plants.

Theoretically speaking, one would not care to risk the expenditure of much time or money in propagating a plant in a region that was destitute of insects that might attack that plant. The absence of such insects would possibly indicate a lack of natural conditions favoring the growth of the plant in question. Thus the presence in any locality of insects that feed on nuts may mean that nuts thrive naturally in that locality and that insects are there because of the abundance of a favorite food.

May I hasten to add, however, that this fact should not lead to an under-estimation of the possibilities of insect destructiveness, nor encourage lax methods in dealing with injurious species. In the beginning of any nut-growing enterprise we should anticipate the coming of insect pests and be ready to meet them. The planting of pure stands of native nut trees sets up a condition under which insects com-

ing from the forest may increase more safely and rapidly than under the more hazardous environment of a scattered forest growth. This applies to cultivated plants generally. It is true of an orange grove, a cornfield or a potato patch. The mass planting of any crop is quite sure to call sooner or later for measures to offset the stimulus which such plantings offer to insect increase.

Reference may be made to a familiar nut plantation which illustrates a natural result of neglecting one of the insect factors. This plantation is the government's chestnut orchard at Bell, Maryland, which was planted for scientific purpose some years ago by Dr. Van Fleet. This orchard of around one thousand trees contains numerous species and varieties of chestnut, some of which bear fruit every year. The various scientific projects carried on in this orchard in the past have all been of such a nature that they called for no consideration of weevil increase. Many nuts have been allowed to lie under the trees until the weevil larvae issued and entered the soil. This has resulted in a constant increase of weevils until infestation of the nuts became practically one-hundred per cent. All nuts of the crop of 1922 were so wormy that when planted they failed to germinate. Injury to the crop of 1923 seemed somewhat less severe, but its extent may be indicated by the fact that 3080 nuts from this orchard which were kept by the speaker in rearing jars yielded 11,085 worms. In the woods adjacent to the orchard the native chestnut trees are disappearing on account of the blight, and presumably weevils are on the decrease. Within the small area of the orchard, however, the increase has been abnormal, due, as has been indicated, to the peculiarly favorable and man-made conditions. If, from the time the trees of the orchard began to bear, the investigations being carried on had called for close gathering of the nuts at maturity and the destruction of all the worms that issued from them, there is little doubt that infestation would have been kept within reasonable bounds. At present, after two years of attention to the collection of ripening nuts, there is an apparent decrease in the number of weevils. Strong emphasis should be placed upon the importance of gathering chestnuts as soon as they are ripe and prevention of the worms from reaching the soil. This is especially true of districts where woods surrounding chestnut orchards do not contain bearing native chestnut trees.

The Nut Weevils

Now that the subject of nut weevils has been introduced, let us consider in more detail these grotesque, long-snouted insects whose

larvae, or grubs, play havoc with so many of our nuts. Most of us have had the experience of gathering in autumn rich stores of our delicious native chestnuts. But how often our anticipations of boiled and roasted feasts have been blighted. We have found that the chestnuts were like the manna which fed the children of Israel in the wilderness. "When we left of them until the morning they bred worms and became foul." There are numerous cases in this country where chestnuts in shipment have been seized and condemned under the provisions of the Food and Drugs Act. Usually the phraseology of the libel has been "because the shipment consisted in part of filthy animal substances, to wit, worms, worm excreta, worm-eaten chestnuts and decayed chestnuts." Altogether the loss to chestnuts from weevil injury is beyond computation.

The beetles which are the parents of the familiar worms in chestnuts are not commonly seen, or, if observed, they are not associated with the disgusting inhabitants of the nut kernels. These beetles represent in their structure a very interesting adaptation to a special end. The mouth is located at the tip of an enormously long snout, or proboscis, and the drill-like instrument is used for puncturing the thick covering of various kinds of nuts so as to admit the egg into the kernel upon which the young will feed. In some cases the mouth is situated at a greater distance from the eyes and other head appendages than is the anal extremity of the insect. There are in the northern part of this country two species which attack chestnuts, one which attacks hickory-nuts, one which attacks hazel-nuts and about a dozen which attack acorns. And here may be mentioned an interesting peculiarity of the feeding habit which is decidedly to the advantage of the nut-grower. Each species adheres closely to its own food plant. The hickory-nut weevil does not attack hazel-nuts nor the hazel-nut weevil hickory-nuts. None of the acorn-infesting species will seek for food in the nuts of chestnut, hickory or hazel. Once the chestnut weevils are absent in a locality, there is no chance that oak trees will serve as a means of spreading the weevils back into the locality. So closely confined are these weevils to their particular food plants that many of them distinguish between the different species of oak and will oviposit only in certain kinds of acorns.

All the different species resemble one another in both the adult and larval stages. There is also a general similarity in their behavior. I have recently discovered, however, a marked difference in

the life cycles of certain species. For example, the larger chestnut weevil and the smaller chestnut weevil look alike, but they are decidedly unlike in their development. The grubs of the larger weevil begin to leave the nuts at about the time the nuts drop. They enter the soil to a depth of several inches and fashion smooth-walled cells in which they remain unchanged until the following summer. During June and July they transform to pupae, and soon afterward to adults. In August they issue from the ground and seek the trees where they collect around the burs and begin to deposit eggs soon after the nut kernels start to form. This life cycle is continued year after year. To forestall starvation of the race in case of entire failure for a year of the chestnut crop, a few individuals carry over the second winter in the ground and then issue as beetles along with the one-year-old specimens. It is probable that a small per cent of the insects may remain in the soil over three winters. Thus does nature by unique arrangements safeguard the lives of even the very small creatures.

The life cycle of the lesser weevil is quite different. The larvae of this species leave the nuts somewhat later in the autumn than do those of the larger weevil. Like them, they enter the ground and pass the first winter unchanged. The grub stage is continued throughout the summer, but late in autumn, after the beetles of the larger species have been on the trees for some weeks and deposited most of their eggs, the larvae of the smaller species transform to adults. Instead of coming from the ground, however, they remain in their earthen cells throughout the winter. The next spring, prior to the blooming of the chestnut-trees, they emerge from the ground and soon thereafter collect in large numbers on the male catkins of the chestnuts. At this time very little feeding is done and the sex instinct does not manifest itself. As the time approaches for the nuts to mature, however, the beetles begin to feed and pair and soon thereafter to lay their eggs in the ripening nuts. Most of the eggs are deposited directly into the nuts after the burs begin to open. In the case of the larger weevils the beetles are present only about three months of the year. Those of the lesser species, however, are perpetually present, those of the younger generation reaching the adult stage in the ground before those of the previous generation have finished laying their eggs in the ripening nuts. As with the larger species, a few of the smaller weevils carry as larvae for several years to tide over possible fail-

ures of the chestnut crop. The life cycle of the hickory-nut weevil is similar to that of the larger chestnut-weevil, and that of the hazelnut weevil is like that of the lesser chestnut weevil. Both cycles are represented among the acorn-infesting species.

Any intelligent warfare against the nut weevils calls for a knowledge of these distinctive life histories. Thus, an abundance of maturing larvae of the larger species this autumn will insure an abundance of beetles to deposit eggs in the nuts next autumn. With the lesser weevil, however, maturing larvae this autumn will not affect the number of beetles on the trees the succeeding autumn but will provide beetles for the crop two years hence. Large numbers of beetles of the lesser species may be destroyed by collecting them from the blossoms of chestnut, but, at that season of the year there are no beetles of the larger species abroad.

These weevils are to be made the subject of a bulletin by the Bureau of Entomology in the near future, in which it is hoped to go more fully into a discussion of control measures.

Walnut Husk Maggot

Although none of the weevils of the group just discussed attacks walnuts, the fruit of this tree has a serious enemy in the walnut husk maggot. This insect is most familiar in the form of multitudes of dirty-white maggots inhabiting the blackened, slimy husk of ripening walnuts. Originally, the black walnut furnished the favorite food of this insect, although the husk of butternuts was sometimes attacked. More recently the pest has turned its attention to the Persian walnuts which are fruiting in many places in the east. The watery, dark-colored pulp into which the husk of the nut is converted when the maggots begin to feed penetrates the shell of the nut and injures the kernel by staining it and imparting a strong flavor. The operation of hulling is also made doubly disagreeable, the nut coming out of the husk discolored and dirty.

These maggots hatch from eggs inserted into the husk of nuts by a light-colored fly about the size of our common housefly. Although easily overlooked, these flies may be seen on the nuts at almost any time in August and September. They have strong ovipositors with which they puncture the surface of nuts and insert into the openings masses of white eggs from which the maggots hatch.

As to the control of this pest, the speaker obtained very promising results in spraying Persian walnut trees belonging to our friend, J. G.

Rush, at West Willow, Pa., with a solution of 1½ pounds of lead arsenate to 50 gallons of water with 10 pounds of glucose sugar added to impart a sweet taste. The flies were observed feeding on the sweet coating given to the leaves and the nuts that ripened later were comparatively free from maggots. It was obvious that the flies died from the poison before depositing many eggs in the nuts.

Twig Girdlers

During the past two seasons the speaker has made special studies of several species of beetles which cut or girdle young hickory trees, or the branches of larger trees, causing the severed part to break off or die. Not fewer than four distinct species of beetles in the east have this habit. Three of the insects do their damage in the larval stage. One of these, *Elaphidion villosum,* has been called the twig-pruner. It is a well known species and its work in pruning the branches of hickory and various other trees has often been referred to. The other two species which sever the wood in their larval stage are *Pseudobidion unicolor* and *Agrilus arcuatus.* Thus far, these two have no common names. In certain localities they are proving to be very troublesome to both young and bearing trees. In one block of a nursery in Virginia I estimated that the Agrilus larvae had ruined one-hundred dollars' worth of young hickory trees. Fortunately, the adult of this species feeds freely on hickory foliage and can be killed readily under nursery conditions by spraying with arsenical poisons.

The fourth girdler referred to is our familiar hickory twig-girdler, *Oncideres cingulatus.* In this case the adult insect cuts a ring-like furrow around the wood and the portion above dies. The purpose of the girdle is to provide dead wood in which the young may feed. After the girdle is made, a process which occupies several hours, and, sometimes several days, the eggs are laid in the bark above. In central West Virginia and northward the grubs which hatch from these eggs require two years in which to reach maturity. In the vicinity of Richmond and southward, however, the larvae mature in one year. This more rapid development in the south probably accounts in part for the recent serious outbreak of this insect in Virginia and the Carolinas.

Each female beetle is capable of girdling several twigs. One female of about a dozen kept in confinement last autumn made eleven girdles and deposited 55 eggs. Several of the beetles continued their

interesting operations until after several snows and severe frosts had occurred.

The twig girdler in the beetle stage feeds rather freely on the bark of twigs. Enough of the surface is eaten to justify the belief that the beetles may be killed by spraying with arsenical poisons. This treatment is being tested at the present time. In the cases of all these insects which sever the branches the wood is killed for the safety and comfort of the insect as it undergoes further development above the severed point. There is a period of at least several weeks in each case after the twig dies during which the insect in one stage or another remains in it to complete its growth. This affords an opportunity to gather the twigs and burn them with the assurance that the insects are being destroyed thereby.

At least some progress has been made in discovering the habits and the methods of controlling these and various other insects that may be expected to give nut growers in the north more or less trouble. The remedies that can be offered at the present time are not in all cases entirely satisfactory. There is much yet to be learned, but there are control measures within the reach of most of the nut growers which are well worth consideration and adoption.

The Secretary: Dr. Zimmerman, will you read to us now?

Dr. Zimmerman: Perhaps some of the members will not be so glad to hear what I have to say, but I feel that there is a need for something along the line I will refer to.

DEVELOPING A NUT INDUSTRY IN THE NORTHEAST

By Dr. G. A. Zimmerman, Pennsylvania

We have all heard of the pecan. No doubt most of us have traveled through the South at some time or other and have entertained a wish for a pecan grove. A personal friend of mine, a minister, told me recently that the only time he was ever tempted to invest in a commercial proposition was when a real estate agent laid a picture of a pecan grove before him. I had entertained the thought that some day I might possess an orchard. Therefore, a couple of winters ago, when I found it necessary to go south for my health, I silently hoped I could kill two birds with one stone, by getting some undeveloped land and starting a pecan grove, which at the same time would keep me in the open air and give me exercise. Consequently, my eyes were always open and I was on the constant lookout for pecans. After miles of travel they appeared. They were very interesting and I went into the subject pretty thoroughly. I was informed that no cheap land was available any more that was desirable for pecans. I am not so sure of that. I was also informed that most of the people who had planted groves had made a mistake, that the pecan business was just beginning under new ideas, and that most of the work would have to be done over. From the amount of trees that are being top-worked I am inclined to believe this is true.

But I didn't kill the two birds with one stone. I did not attempt to build up a pecan grove, but instead I came back with the idea firmly impressed that we have a better proposition for the future right here, that we have right here in the North the building material in the shagbark hickory and the black walnut for a nut industry that will rival or even surpass the enviable position the pecan holds today. Was I correct or was I wrong? A second trip last winter has served only to imbed that idea into a firm conviction.

What ground have I for drawing this conclusion? Some of you, my friends, may disagree with me in some of my remarks, and no doubt insist that I am uninformed. Perhaps I am, but I am giving my convictions nevertheless, and I ask you to withhold judgment for twenty years before deciding against me.

Why has the pecan forged to the front as it has? Because the

pecan is a good food, easily available, of pleasant taste and presents a fine appearance. From a commercial standpoint, after 20 years or more on the pecan, there is only one really desirable variety available, namely the Schley, and the fact that it readily sold last fall for 80 cents per pound wholesale, while the choice of the other varieties brought 60 and 65 cents per pound, bears me out in this. I am not referring to the greater productivity and other qualities of some of the other varieties. Many of them are tolerated for various reasons.

How about the shagbark in the North? It is my belief that we do not have at present a shagbark that will anything like meet the pecan of the South, yet the consensus of opinion of the people I know who have eaten both, decides in favor of the shagbark. The quality of a very ordinary shagbark is better than the best of pecans. What then, is lacking? Size, shape, thinness of shell, cracking qualities, color, everything but flavor is lacking in most shagbarks. Don't misunderstand me. I am not condemning what we have, for I believe that if as many years are spent by as many people in finding or developing a shagbark, we will have one that will surpass the pecan. But as the matter stands I am constrained to say that I do not know of a really good nut today that will stand the test of building an industry that will compete with the pecan. We must find or develop a couple of really good nuts that will compete, nuts that are large, smooth, shell thin enough to crack with the fingers, a white kernel that is plump and easily extracted. I do not believe that any thick shell nut will ever meet the favor it should or become extremely popular. The Weiker, one of our best, is of good size, looks fairly well, but the shell is thick and it is poorly filled. It will never fill the place for a real industry, and yet they sell for a good money-making price today.

If we build our groves after this standard we will be in the same place in a few years that many of the pecan growers are now, namely, with a lot of trees on hand that must be top-worked later on. But they are the best we have and, like the old adage that it is better to love and lose than not to love at all, it is better to go ahead with these than not to go at all.

How about the black walnut? This nut will come to the front and be popular for baking purposes and candy-making, for it is the only one that holds its flavor after heating. But its competition will be against the thin-shelled English walnut. It will not be extremely

popular until we get one with a shell equally thin. At present we do not have one.

How then can we anticipate a great future industry after meting out this doleful outlook? Are we going to discard everything we have and start again? By no means. The price of nuts, even of the ordinary class, is sufficient even now to well repay any man for his effort, if producing them on a large scale, and what must be done is to encourage more people to become interested.

If we could arrange to have nice exhibits of named varieties of nuts at the various county fairs, and have someone there to explain them, a good deal of interest could be created. I frequently see native nuts displayed, but not named varieties.

I shall not refer to the hazel, chestnut, pecan nor butternut, all of which I believe can be developed into a more or less successful industry but only repeat in closing that I am convinced, after pretty thorough investigation, that the shagbark hickory and the black walnut can be developed into an industry in the Northeast in a much shorter time than it has taken to develop the pecan, to a point that will equal or surpass the enviable position that nut holds today. But, and let me impress this point, we must develop a few new and better nuts to do it. On account of the colder climate, which goes for the developing of fine flavor in all products, I do not believe the pecan will ever equal the shagbark in quality. This is our great natural advantage.

Dr. Morris: I accept all of the statements by Dr. Zimmerman with one exception. The pecan is tremendously prolific and so productive that there are records of 30 bushels to a tree. I do not know that any of the shagbarks or shellbark hybrids ever will rival that in production. From the marketman's point of view production is of prime importance. In this the pecan out-rivals the black walnut.

TRANSPLANTING NUT TREES

Willard G. Bixby, Baldwin, N. Y.

When I set out the first nut trees which now are growing at my place at Baldwin, I was very particular to follow the best advice obtainable. What this was is to be found in Bulletin No. 5, published by the association, pages 8 and 9, under Planting Directions. I will not take time here to read them but will refer those interested to that publication.

Much that is to be found there is unquestionably the best practice that we know today. The importance of preventing the roots from drying out, digging holes of sufficient size and filling with good top soil, firming the soil well about the roots, severely cutting back after planting and staking newly set trees if they are of appreciable size above ground, are of the utmost importance and should be emphasized, but others of these directions have been modified in my practice and I will relate the unfortunate experiences which caused these changes to be made.

From the start there has been trouble in transplanting hickories, difficulties with other trees being small in comparison. Out of a number of fine looking little grafted hickories set out in the fall or spring some would be sure to die. They mostly came from Mr. Jones, who, as a rule, has furnished the finest looking hickories that I have received, and were finely packed and seemingly ought to have lived, but only part of them did. After loosing a number out of one lot, I watched the lot purchased next year with particular care. Three out of a lot of six, which had put out leaves well in the spring, by the middle of July began to show signs of distress, the edges of the leaves beginning to turn brown which the year previous had been the beginning of the end. I knew what had happened the year previous, felt that the trees would die if something was not done, and did something. That something was to dig about six quarts of chicken manure and two trowels of nitrate of soda around the three trees that looked sick and saw that they were watered plentifully till a heavy rain came. At first nothing was noticed, but after a while the brown disappeared on the leaves that were only slightly brown, while in other cases new leaves put out and finally a second growth of shoots, very small to be sure, but the

trees had been saved. This was diametrically opposed to previous practice of putting no manure or strong fertilizer in holes when planting the trees, but the result was so satisfactory that I have continued to dig in about ¼ of a wheelbarrow of well rotted stable manure around each tree when planting and two trowels of nitrate of soda in May when the growth should start in the spring.

The above treatment seemed almost entirely to solve the difficulties of transplanting and for about two years practically no hickories were lost. Twenty-four Hales trees, 10 years from grafting brought here from Monticello, Florida, all lived through the first year and 23 of them through the second and now seemingly have a long life ahead of them. Inasmuch as Mr. Jones expressed his doubts as to how successful this experiment would be I regarded it as somewhat of a triumph. On the other hand out of the finest looking lot of young Iowa hickories grafted a year ago this spring and shipped in the fall and set out just as carefully as I knew how, with well rotted stable manure in the holes and seemingly having every prospect of a long life before them, all have died now, excepting four, two of which I am making desperate efforts to save.

The reason for this failure has not yet been proved, but I have an idea what it is. With two exceptions the stocks were not large, unusually small in fact, and the growth of the grafts was small, but, except for their small size of stock and graft they were fine looking little hickories as one often sees. The two that are in good condition today were bitternuts on bitternut stocks and both the stocks and grafts were notably larger than others. One of these bitternuts by the way, is bearing this year. Evidently there was not as much vitality stored in the smaller trees as in the larger ones. I am inclined to believe that the real trouble was because the grafts, excepting the bitternuts, had not become sufficiently established before having to stand the shock of digging, shipping and transplanting. I have noticed in experiments made to determine the adaptability of a number of species of hickory as stocks that it was not unusual to find that a graft would do reasonably well the first summer and die the second. If this happens occasionally when hickories have not been transplanted it is undoubtedly very much more likely to happen when they are transplanted. I have had practically no losses in transplanting hickories when the graft had grown two seasons before being transplanted. The safe plan, then, would seem to be to let a graft grow two sea-

sons before transplanting. Unfortunately this will add to the cost of grafted hickories which even now are so expensive to produce that almost no nurserymen grow them.

Another one of the commonly accepted principles that I do not now follow is that of not planting trees any deeper than they grew in the nursery. I prefer to plant them a little deeper, say two inches or so. I do not recall losing any trees seemingly from this slightly deeper planting, while I did lose a considerable number of seedlings last year that were inadvertently planted two inches or so too shallow.

Outside of the hickory I have had little trouble in transplanting any trees excepting some of the hazels. Unless hazels, particularly American hazels, are very well rooted, they will need more care the first year than most nut trees, particularly protection from the hot sun and drought. If I get poorly rooted hazels I now plant them in a shady place for a year or two if they have not grown well the first year, and then move them where they are to stay.

The President: Mr. Snyder of Center Point advocates planting trees two to four inches deeper.

Dr. Morris: In Dr. Brooks' paper he spoke of some of the twig girdlers in the beetle stage which feed upon the bark of twigs before ovipositing, and he said that gives a weak point where we may attack them. On my place at Stamford, where there are forests, that would be impossible. I have had a good many hazels partially destroyed this year by girdlers. A great many of the branches have the larvae in them. I find also a large number of small hazels on which the leaves and branches are dying, though there is no apparent injury to the bark. Suddenly, however, a little twig will drop off and yet, in cutting into them, I did not find any larvae.

Dr. Brooks: That happens to be the work of an insect which I am just beginning to study, one of the flat-headed borers, and the reason you have not seen the larva is that it is very small. It is not half an inch long. In the second year it comes out as an adult. I judge that control measures should be used in the spring, when I think without doubt that it would feed on the poisoned spray.

Dr. Morris: I find a great many larvae in dead twigs on the ground. If we are going to get this pest out of the way, we should not only look at the twigs on the tree, but at those on the ground as well.

Dr. Brooks: That is true of all of these curculios. Dr. Morris'

statement is true. The ground should be gone over and the dead and dying branches and twigs of the trees should be collected. The insects mature in them.

Dr. Collins: Would you advocate pruning often?

Dr. Brooks: No.

Adjournment to lecture hall. Mr. Henry Hicks of Westbury, Long Island, gave a talk on the transplanting of large trees by his methods, illustrated with lantern slides. This was followed by a talk with lantern slides, on

HEREDITY IN TREES AND PLANTS

By Dr. A. F. Blakeslee, New York

Dr. Blakeslee said in part:

One of the first things we notice as we go out into the open is diversity in the habits of trees and plants. It is through the details thus presented that we are able to distinguish one species from another. You can see this diversity the year round in nut trees, and in the nuts.

If you arrange nuts, or any other objects for that matter, in a curve according to size, you will find that the most numerous of them are of about the average size. This is equally true when applied to mankind. What is the reason?

There are a number of factors affecting this, but, in general, there are two main causes—environment and heredity. We do not know which is the more important but both are absolutely necessary.

In the picture being shown we see the influence of the black walnut upon plants around it. It creates an environment which influences the ability of other plants to grow near the roots.

It must be remembered, however, that what the animate plant transmits is not the actual character in question, but the ability of the animate plant to develop characteristics. By placing the plant near a black walnut tree we do not affect anything but the capacity of the plant to develop in certain directions.

I have shown here a diagram to illustrate a certain stock fertilization. Here we have the plant with its stamen and pistils, the egg cells and the pollen. There are two types of pollenization, one where

the pistil is fertilized by insects carrying sticky pollen; the other by movement of the wind carrying the pollen. If I should believe my records, in attempts to cross trees, I might have a cross between a birch and an alder, in which the pollen is carried by the wind. I tried once to hybridize pines. I put some pitch pine pollen on the female flower of another species and seed resulted. I did this the second year and again I got seed. The third year I put bags on the female flowers before I could see them developing. Then I got no seeds. I believe that the pollen which had caused the seed to set in the preceding instances had come from the south for perhaps hundreds of miles.

There are times when the pollen of the staminate plant is all shed before the pistillate gets ready. Sometimes we have a plant that is self sterile. I have experimented with pollen from several different nut trees and also with the Norway spruce. Then again, there are abnormal cases; sometimes there is parthenogenesis. The jimson weed is the first plant which has ever been reproduced by parthenogenesis. Since that was discovered, an investigator in California has found a similar case in fruit developed without pollination.

One of the most important conceptions in heredity is its effect upon characters and factors. Take the Japanese bean here shown for example, one dark bean and one mottled. In the next hybrid generation we find three mottled and one dark. That is the familiar "three to one" ratio of Mendel's law. We believe now, that all, or at least a very large proportion of the heredity characters in plants of all kinds may be due to a series of factors; but the habit of growth of the plant is due to a single factor. We have the case here of a second generation of the weeping mulberry that I crossed with the white mulberry. As a result there was an average of three erects to one weeping one. Certain characteristics may be made up of the inter-action of a large number of factors. This will give a little idea as to the complexity of Mendel's law.

How do we get new characters in nature? New types are due to the rearrangement of previously existing characters, just as with the old-fashioned kaleidoscope, where you turn the crank and get new pictures. Another way is by the sudden appearance of new factors.

I wish to speak about one effect of hybridization, which is really connected with heredity factors, the vigor which occurs when we cross different varieties, species, or even races. In my experience certain types that have been naturally contrasted finally lose vigor, and after

two or three generations the plant disappears. Then again I could show you cases where yields are greatly increased due to hybridity. These are established facts, not only as regards species of plants and trees but also as regards the human race. Hemy, in Dublin, who has done the best work in this line of endeavor, believes that many of our more rapid-growing trees are rapid-growing because they are hybrids.

To summarize, I have tried to point out the fact that diversity which we see in nature is real, and that it is brought about by two causes, namely, environment, and heredity. And that heredity is brought about by factors in the bodies of the chromosomes which are shuffled around like cards in a pack; they reappear in the same way that the cards will reappear. We have no means, as yet, of controlling the appearance of the factors, but we have two methods of getting new factors, as follows:

One—The finding of new things in nature; that, probably, is the very best method that can be used. The work of the theoretically planned project points out the tremendous importance of the exceptional individual.

Two—By taking the exceptional individuals, and by crossing them, you can recombine, although the results may be very complex, and obtain characters that are very desirable.

As ministers sometimes say to clinch the moral, I would say, "Seek earnestly that which is best and hold fast to that which is good."

The President: Has anyone a question he would like to ask?

Dr. Morris: In attempting to make crosses between juglans and carya we find often that the pollen of carya will excite the cell of the juglans but without making a fusion. What is the element of the male cell of the hickory which starts the female cell of the walnut into action?

The Secretary: I would like to ask Dr. Blakeslee one thing; he showed the influence of the black walnut on the growth of the hedge, and he showed that something other than the effect from the black walnut had caused these plants to be dwarfed. Is that understood to be a fact?

Dr. Blakeslee: No; some of the effect was due to the black walnut.

Mr. Hicks: In some cases the trees get sick and die. I have observed many plants and trees growing close to walnuts and I can point out peach trees and other fruits planted close to black walnut

trees which have been injured. I should like to see the question determined.

Mr. O'Connor: On Mr. Littlepage's place it seems that some blackberries thrive better in the shade of the walnut tree than anywhere else.

Dr. Brooks: In West Virginia there is a locality where blackberries grow wild, and it is a matter of common knowledge that black berries will grow under the black walnut but that apple trees will not grow there. I have noticed that the best place to plant jimson seed is under the black walnut trees. I have no definite information about this but there is something in the influence of the black walnut trees.

Mr. Binby: I have noticed at my place that cabbages planted under black walnut trees were somewhat stunted. I believe that it was the effect of the walnut trees growing so speedily that there was not enough nourishment for both.

The President: The next lantern slide lecture will be by Mr. Reed.

Mr. Reed: (This lecture was delivered in a darkened hall where it was not possible for the reporter to take notes. However, the gist of the talk is here given).

The slides illustrated various methods of nut tree propagation, and that it is possible successfully to graft or bud nut trees at almost any time from February until the very end of the growing period. In working over large trees the first method in the season to be employed was shown to be that of the cleft graft. Following this, with large stocks, would be the slip-bark graft, or with smaller stocks, the chip-bud. The slip-bark graft has the advantage of being feasible at any time when the bark slips. Dormant scions are more often used with this form of propagation, although by no means necessary, as Dr. Morris has demonstrated that by applying a coat of paraffin over the entire scion and the cut surfaces of the stock, it is possible to use growing scions at almost any time when they can be obtained. The chip-bud is most successful during a relatively short period, beginning about ten days before the buds begin to swell and continuing until after the trees are practically in full leaf. From this time on the patch, or some other modification of the annular bud, is most commonly used.

In top-working, when the cleft-graft has failed, the patch-bud may be used late in summer, by inserting buds of the current season's

growth in the base of the new shoots springing up from below where the cut was made in the stock for the graft, thus affording two opportunities for propagation during the same season.

The slides showed various methods of propagating the filbert by layering, and of propagating more difficult species by inarching. They were from a collection soon to be placed in the hands of the extension Service of the U. S. Department of Agriculture and of the various state colleges of agriculture.

The President: We will now adjourn, and will meet in the room upstairs in this building at 10 o'clock tomorrow morning.

SECOND DAY—MORNING SESSION

Meeting called to order by the President, at 10 a. m.

The President: I have the great pleasure of introducing to you Dr. Howe, Assistant Director of the Botanical Gardens.

Dr. Howe: I shall only take a minute to say that we are delighted to have you here, and that if we can do anything to assist you, or to perpetuate your success. I hope you will please let us know. As the Spaniards say, "The house is yours."

I hope that your visit will be so pleasant that you may find it convenient to come here again.

The Secretary: Mr. Jones will you tell us something about the handling of seeds for planting?

Mr. Jones: I did not give the subject any thought before coming here but I might say that the nuts should be gathered promptly and dried, placing them in a shady spot, for they can be injured where the sun is too warm. We stratify them in sand. Then in the spring you can sift the sand through a sieve, take out the nuts and plant them.

In stratifying chestnuts we keep them between layers of wire mesh, for mice are very fond of these nuts. We cover the nuts with sand and leaves. Chinkapins we usually keep in cold storage.

The Secretary: When you stratify these nuts where do you keep them?

Mr. Jones: Right out in the open on top of the ground. A frame may be made with wire nailed on the bottom. This may be set out anywhere in the garden, but down a little into the dirt. Put in the nuts between layers of sand and leaves.

The Secretary: Mr. Kelsey told me that the best way he had found to keep nuts was to bury them in a deep hole, perhaps two feet deep. Have you had experience with that way?

Mr. Jones: The way I described is the usual way to keep seed and we get very fine results. We do that in order to keep the seed cool and so that they will not dry out. But we always have to watch out for mice. It might be a good idea, in stratifying chestnuts in the box with wire mesh on the bottom, to place the box at an angle that would drain off at least part of the water.

The Secretary: Dr. Zimmerman, have you anything to say?

Dr. Zimmerman: I discovered by accident that black walnuts and hickories could be kept very nicely in the dry state until spring; then put water on them and they will sprout very nicely. But my chestnuts get moldy that way.

Mr. Bixby: We cover the nuts with at least a sprinkle of earth, may be four or five inches.

The Secretary: Mr. Jones would keep them with practically no dirt but with sand and leaves.

Mr. Jones: I would use a little sand over them, two parts of sand to one part of nuts. We put in six inches of nuts and alternating layers of sand.

Dr. Brooks: I know of a man who puts a layer of chestnuts and one of moss and says that in the spring the nuts are in splendid condition.

Mr. Bixby: I have had the nuts sprout very much better when they were stratified as soon as gathered.

Mr. O'Connor: I bought about 5 bushels of black walnuts, paying 75 cents a bushel for them. I simply dumped them out on the ground, not bothering about the shucks at all, and covered them over with dirt. I paid no more attention to them until spring. Then I put the nuts in trenches with dirt about 5 inches over the top. The mice did not bother them, and I think they did well that way.

The President: Did the frost affect them?

Mr. O'Connor: No, not at all.

The President: I have a black walnut tree at home that started to grow in a neighbor's cellar. It had grown a foot and a half and was rather white in color. I cut off the top and planted it out in the open. Today the tree is still growing and is all right.

We will now have an address by Prof. Neilson, of Canada.

Prof. Neilson: Mr. President. Ladies and Gentlemen: It is a real pleasure for me to get back to this convention once more. I tried to come last year but owing to certain difficulties I was not able to do so.

Before I give you my report on nut culture in Canada, I want to tell you some of my troubles. Two or three years ago, when I began to express my interest in nut culture, I thought it would be a good idea to get some nuts from China. I wrote to several missionaries in Northwestern China at about our latitude, and I finally secured five bushels of Persian walnuts and one bushel of Chinese chestnuts. The nuts were a long time on the road and very few were in fit condition to use when they arrived. I stored some of the Persian walnuts in our cellar at the Ontario College. The rest of the nuts I distributed to others.

The nuts at the college did not fare very well. When I left there I gave directions to the members of the Department to look after them carefully. This is how they did it. Someone broke into the cellar where the nuts were stratified in the sand, and ran off with about one bushel. The Chinese chestnuts arrived in about the same condition as the Chinese walnuts. Of these I managed to save about a peck. We divided the nuts into three equal lots. Some we kept at the Guelph Experiment Station, some at Vineland, and some in the Southwestern Station. Of those at Guelph, out of the whole lot, 35 nuts germinated, and of these the mice ate all but five. These five were taken outside and carefully placed in a flat: but someone came along and ran into the flat and smashed those five plants all to pieces.

In addition to this some of my friends tried to tell me that I was chasing wild geese; that nut trees would not ever be important commercially in Canada; that 99 per cent of the value of the nut tree was for shade anyhow (as if he meant shade for pigs and cows); and that they were not even ornamental.

Before I read my paper, however, I will say that the work I am now doing is somewhat different from that I had when I was last here, when I was Prof. of Horticulture. I am now doing extension work for the government.

PROGRESS REPORT ON NUT CULTURE IN CANADA

Jas. A. Neilson, M. S., Extension Horticulturist, Horticultural Experiment Station, Vineland, Ontario

During the season of 1923-24 there has been a marked increase in the interest shown in the culture of nut bearing trees in all parts of Canada where nut trees can be grown. This is indicated by the numerous letters of enquiry and personal requests for information on nut culture which have been received by our Station. A total of 450 letters were received or sent out by our office during the past year besides numerous enquiries answered by a personal visit.

The search for good nut trees has resulted in some interesting additions to the data presented in the paper published in the last report. One of the most gratifying features of this phase of the work has been the discovery of several new localities where the European filbert is growing successfully. It has been located or reported at twenty widely separate points in Ontario, the northermost of which is on Wolf Island at the mouth of the St. Lawrence River in approximately 44,100 N. Lat. This plantation is said to have been established before 1840 and would therefore be nearly 90 years old. Another interesting point in connection with filberts is the amazing way in which they thrive under conditions of absolute neglect. Several of the plantations observed during the past year were not given the slightest attention and yet were doing very nicely. Obviously this is not good practice but it would seem to indicate that excellent results could be secured in Southern Ontario by the proper choice of varieties and the best cultural methods. This survey also showed that the sweet chestnut grew as far north as Georgian Bay.

The prize nut contest staged by our office last autumn resulted in the discovery of some very good black walnuts and a fine Japanese heartnut. Samples of these are shown in some of the plates on the table.

The Persian walnut was found to have a wider distribution and is more abundant in Ontario than was expected when our nut survey began. About 150 bearing trees have been located in that part of Ontario extending from Toronto on Lake Ontario to Goderich on Lake Huron. This number of course will seem insignificant in comparison

to the numbers of trees in some sections of the northern United States, but it must not be forgotten that Ontario is on the northern margin of the Persian walnut territory, and therefore the results are rather encouraging.

Several fine Paragon chestnut trees have been located which bear good crops and which appear to be resistant to chestnut blight. This disease has unfortunately appeared at several places in Ontario and will undoubtedly destroy the majority of our chestnut trees.

The members of this association will be interested to learn that Gellatly Brothers of Gellatly, B. C., prepared and sent to the British Empire Exhibition at Wembley a large collection of nuts that has attracted a great deal of attention and favorable comment. This should do a great deal toward advertising the nut cultural possibilities of that province and of Canada generally.

The trial plantations on the experiment station grounds are doing very well indeed. The black walnuts are making a fine growth and one variety the McCoy, has a good crop of nuts at two years from planting. The Ten Eyck is making an extremely rapid growth, in some cases, producing new shoots over four feet in length.

The English walnuts are also making a good growth and two varieties, Mayette and Hall, have borne nuts in the third season.

I am pleased to state that we now have about 100 seedlings of the Chinese walnut growing on the station grounds and at various other points in Ontario. These little trees seem to be making a more rapid growth than our seedlings of the "Ontario," a Persian walnut which is a native of St. Catharines.

We also have about 60 seedlings of the Persian walnut from the Northern slopes of the Carpathian Mountains in the Ukranian region of what used to be the old Austrian-Hungarian Empire. These nuts were obtained from Rev. Paul Crath, of Toronto, who informs me that the winter temperatures in that part of Europe often go lower than in Toronto. We hope for some interesting developments from the growth of these trees because of the rigorous climatic condition of their native land.

During the latter part of the past winter an experiment was conducted in propagating the walnut under greenhouse conditions. For this purpose 100 well grown one year black walnut seedlings were obtained from our forestry station at St. Williams in the late autumn and heeled in out of doors until about February 1st. These were then

brought inside, planted in 8 inch pots and placed in the greenhouse where they were allowed to remain until a good leaf growth had been produced. The young trees were then side cleft grafted with scions of the best English walnuts in the district. While engaged in this work one of the trees was inadvertently cut off a few inches above the ground. The stub was then whip grafted and to my surprise it made a better growth than the others which had a part of the top left on. The results of our experiment were much better than I expected. About 40% of the scions grew which was quite satisfactory considering that I was a mere novice in the art of grafting nut trees and that my method was an experiment. I believe I could get 70 to 75% to grow with greater care in the selection and handling of scions. The object in doing the work in the greenhouse was to obtain better control conditions of moisture and temperature and thus reduce the mortality of scions due to these factors.

I also outlined an experiment in propagating nut trees by cuttings as a thesis subject for one of our fourth year horticultural students at the O. A. C. In this experiment ten cuttings each of English walnut, butternut, Japanese walnut, hickory, chestnut and black walnut were planted in sand and watered at intervals with a 1 to 10,000 solution of potassium permanganate. In the course of time the majority of cuttings came out in leaf, but none formed roots, and hence soon died. It is admitted that this experiment may have been improperly planned and conducted, but it showed at any rate that it is not an easy matter to propagate most nut plants by root or stem cuttings.

In 1923 I purchased with my own funds another lot, 1½ bushels, of good heartnuts and sent them in lots of about two dozen to the secretaries of 125 horticultural societies, and to about 30 other parties for trial planting. I found that this little contribution was gratefully received and in many cases brought forth inquiries for the names of people from whom good trees might be purchased. I do not propose to carry on much more of this free distribution of nuts as that would not be fair to the individuals themselves or to those engaged in the propagation of nut trees. My chief reason for distributing these nuts was to stimulate interest, and now that my objective has been attained I will refer inquiring parties to reputable nut nurserymen.

Numerous requests for addresses on nut culture have been received from horticultural societies, women's institutes and other organizations. I have always endeavored to comply with these requests

and have invariably found keen interest shown in the subject. American members of this association will likely be interested to learn that the Ontario Horticultural Society is the largest of its kind in the world, having a membership of over 60,000 while the Women's Institute is an almost equally large and influential organization.

These powerful and widespread organizations can be and are of great assistance in carrying on the propaganda for the planting of nut trees.

The Ontario Horticultural Association, the Ontario Horticultural Council and the Canadian Horticultural Council have each passed resolutions expressing approval of our work in nut culture and asking the Dominion Minister of Agriculture to appoint a man to fully investigate the nut cultural possibilities of Canada. I regret to state that no action has as yet been taken to meet the desires of these organizations. Because of many other urgent duties and lack of departmental support, I have not been able to devote as much of my time to nut culture as I would like, and therefore have had to make the very best use of the little time I have had at my disposal. I am looking forward to the time when those in authority will have a greater appreciation of the value of nut trees and will see their way clear to appoint someone to devote his whole time and energy toward increasing the productiveness and adding to the beauty of our country by means of more and better nut trees.

To sum up briefly, my objective is as follows:

1. To carry on the nut tree survey of Canada until we have located the very best natural and exotic species.
2. To propagate these best strains, provided they are as good or better than the best so far discovered.
3. To introduce the best hardy species from the northern United States and northeastern Asia, on a more extensive scale for test purposes and breeding work.

The Secretary: Prof. Neilson has placed on the table in the hall, very modestly, a very interesting collection of nuts from Canada and I hope that you will all look at them.

The President: Are there any present who would like to ask Prof. Neilson questions?

Dr. Morris: It seems to me that the Ontario walnut is the best in quality of any I have tried. What did you think of them Mr. Jones?

Mr. Jones: I do not think there is any better.

Prof. Neilson: I am in favor of another one which I think you

will agree is still better. It is larger and betterlooking and the flavor is just as good. (Displays walnut).

The interesting feature is that although the tree is a third generation tree, now about 15 years old, it has produced more nuts than the older trees.

Dr. Morris: If I remember correctly the Ontario is a milder type.

Prof. Neilson: I think that this is just as good as the Ontario. I have several trees of this.

The President: From what I gathered from your remarks, Prof. Neilson, possibly some moral support would be of assistance to you in your work. Would it be out of order?

Prof. Neilson: I think it would be a very good idea. The trouble I am having is perhaps very localized; it is with but one or two individuals. I think that a resolution by this association would have some effect. It would at least present to the authorities the fact that we were being recognized. I hope so at least. Our present Minister of Agriculture has openly expressed himself in sympathy with the idea of planting more nut trees; also Mr. Martin, our specialist in poultry keeping and I think if I can get them lined up it would be all right. The resolution might help to do this.

The President: Dr. Morris the Chair appoints you to that committee; also Mr. Jones and Mr. Ellis. It wishes you to draw up a suitable resolution for that work.

Prof. Neilson: I may say that the public in Canada is behind our work. About 97% of my time is spent on the road and I go long distances. The rest of my time I am writing letters, about 1,200 of them, and about 450 of these are on nut culture.

Dr. Morris: I have the following resolution to offer: That a letter be written to the Dominion Department of Agriculture, along the following lines: "The Dominion Department of Agriculture has officially stated that the nut growing industry of British Columbia has become an important one. The Dominion nevertheless is importing $5,000,000 worth of nuts annually from other countries.

In view of these facts, the Northern Nut Growers' Association in assembly at its 15th Annual Meeting, in New York, commends the work of Prof. J. A. Neilson of the Horticultural Experiment Station at Vineland, Ontario, and expresses the hope that the Canadian Government and private support will further his work in such a way as to make it a matter of large public service. Service of the sort re-

lates not only to eastern Canada but to the commerce of this entire continent."

(Signed) Robert T. Morris.
J. F. Jones
Z. H. Ellis.

The President: The secretary will accordingly transmit this message to the Canadian Government.

NOTES BY PROFESSOR A. S. COLBY

Purdue University, Illinois

Friends: I believe an apology is due you. I was away on my vacation at the time the invitation came to me to make an address at this meeting and I have come here without one. But I shall be glad to give you some sort of an idea of the past, present and future of nut culture in Illinois.

I became actively interested in nut growing about a year ago. Our work started partly in response to public demand. We have been receiving an increasing number of letters of inquiry from people interested in the subject but who know little about it. We are attempting to secure such information as will be of value regarding the best species and varieties of nuts to plant, where to plant them, and how to care for them. There are a number of members of the N. N. G. A. in Illinois and they are very kindly helping me in this work. The Illinois State Horticultural Society, founded in 1856, has also been interested to some extent in nut growing.

Illinois has had three grand old men in the nut industry, Mr. George W. Endicott of Villa Ridge, Mr. E. A. Riehl of Alton, and Mr. Benjamin Buckman of Farmingdale. Mr. Riehl is eighty-seven years young now and is the only one of the three men living.

Mr. Endicott was interested, not only in the commercial side of horticulture but was a pioneer in scientific work. He originated the Endicott plum and other valuable fruits and, since he was interested in plant improvement, naturally turned to hybridization of the chestnut, a tree which grows readily in southern Illinois. In 1899 he crossed the Japanese chestnut (Castanea japonica) with pollen from the American Sweet (C. americana). He must have had some difficulty in cross-

ing the species because they did not bloom at exactly the same time. He was, however, successful in securing five hybrid seeds, raising three trees from them, naming them the Blair, the Boone and the Riehl. Naturally there were differences in the characteristics of these trees though they were all vigorous and produced nuts of commercial value. The Blair and Riehl began to bear at four and five years respectively, while the Boone bore its first crop at seventeen months of age. The Boone is the most valuable since it matures fruit of good quality about two days earlier than the Blair and two weeks before the Riehl. It also retains the burr and drops the nuts free at the beginning of the season so that about half the nuts can be picked up before the burrs fall.

Mr. Endicott was so pleased with the results of the cross that he raised over 175 seedlings from the Boone tree. From these second generation hybrids he secured trees very uneven in growth and size with a great range in time of coming into bearing. The nuts differed widely in size, quality, and season of ripening. The character of the burr showed all gradations between the extremes of thickness, length, rigidity of spines, etc. These striking variations in the second generation trees show that many hereditary factors had been segregated and recombined and offer a most interesting opportunity for scientific study. I have visited the orchard several times.

Mr. Endicott died in 1914 but his son Robert has since cared for the trees which have brought him considerable revenue. He tells me that he secures about 160 pounds of nuts per year from each of the three original trees. At an average price of thirty-five cents a pound wholesale the crop from each tree is worth $56.05 per year. Since the chestnut blooms late it is pretty certain to escape spring frosts. The Blair, for example, has had a crop failure once only since beginning to bear.

(Displays photographs of the Japanese and American chestnuts and the Boone tree).

Mr. Endicott is top working some of the worthless second generation trees with wood from the Boone tree.

(Displays photographs showing method of grafting).

I have had the good fortune to visit Mr. Riehl several times and have secured many representative nuts from his collection. While he has grown a large number of nut species and varieties he believes

that the chestnut pays the best in southern Illinois. He plants them on rough and hilly land, difficult to cultivate, pasturing with sheep, and has had very good success. He does not worry about the chestnut blight, since the chestnut is not native here and there is such a great distance between the blight ridden East and Illinois.

Mr. Buckman was an amateur horticulturist, in the work for the love of it. On his land he had nearly two thousand varieties of apples and hundreds of varieties of peaches, plums, pears, cherries, grapes, small fruits, and nuts collected from all over the world. I was much interested to study the fine pecan and chestnut trees growing and producing good crops as well as the persimmon and papaw trees, of which he had a number of rare varieties. I was able last spring to secure cuttings of a number of rather rare papaw varieties which I sent to Doctor Zimmerman for propagation at the request of Doctor Fairchild.

Mr. Buckman recently died and there is now a movement on foot to secure, either through the University or the Horticultural Society, as far as possible, all the valuable data which he had been collecting for years.

There are several other men interested in nuts as a commercial proposition in Illinois, such as O. H. Casper of Anna and Judge W. O. Potter of Marion. I recently visited these orchards. Mr. Casper has mostly pecans and walnuts growing in sod. They are from six to eight years old and would have borne this season if weather conditions had been favorable.

Judge Potter has over twenty acres of pecans interplanted with chestnuts and filberts. For part of the orchard this is the fifth growing season. The trees are growing vigorously and make a very impressive showing. I counted thirty-nine nuts on a representative Thomas black walnut tree. The filberts look especially promising. Although the weather at blooming time was unfavorable a fair crop of nearly a peck was gathered from four or five bushes of a late blooming imported variety. Judge Potter is also growing another orchard using apples as fillers between black walnut trees. This experiment will be watched with great interest since it will be of great value in showing future possibilities in nut growing in Illinois.

Now as to some of the things we are trying to do at the experiment station at Urbana. This will be necessarily a progress report. I am making a survey of the state to find promising individuals of the dif-

ferent species and varieties and marking them for future use. We have our state fair at Springfield next week and as I speak to the boys and girls attending the state fair school I hope to interest them to tell me of any trees in their neighborhoods of particular value.

Some of the agricultural leaders in the various counties, that is the farm advisers, are awake to the value of the nut industry and we have a number of these men co-operating with us. From Gallatin County, in the Wabash and Ohio river bottoms, around $100,000 worth of native pecans are sold in some seasons. In the southern counties and over north of St. Louis in the western part of Illinois there are also native pecan groves which are quite profitable. We hope to find valuable northern pecans, adaptable to our conditions. We, of course, know that the English walnut is very difficult to grow in Illinois and we are not recommending it as a commercial proposition. We believe that the black walnut, all things considered, has the most promise and we hope to have something worth while in a few years as propagating material. The Thomas, Stabler, and Miller are especially to be recommended for Illinois at this time.

We hope soon to have a complete collection of hardy nut trees on our experimental trial grounds. Here we shall study not only the varietal characteristics but try out new methods of propagating, pruning, fertilizing, etc. There is very likely some connection between winter injury and hardening up of the wood in autumn and we hope to learn something about that problem through the use of various cover crops, for example. We have at the station a complete experimental cold storage plant in operation where we may be able to learn more about the effects of extremes of temperature on the roots and trunks of certain species.

In such new but important work we must make haste slowly. We have some things to unlearn and many things to learn. We hope to be able in a few years to make a worthwhile contribution to such an interesting and important subject as nut growing in the middle west.

I shall be glad to have you ask me any questions which occur to you.

The President: Do you happen to know Mr. Spencer?

Prof. Colby: No. I wrote Mr. Spencer but I did not get any reply from him. I hope to visit him this fall.

Mr. Reed: Do you know anything about the top-working of black walnuts from Missouri at the university?

Prof. Colby: No, I do not know about them.

Mr. Green: In regard to those Gallatin County nuts; has any survey ever been made by the U. S. Department of Agriculture of the nut trees in Illinois?

Prof. Colby: Not that I know of.

Question: At what age are they planting those walnuts in Williamson County with apples and how far apart?

Prof. Colby: The walnuts are from 50 to 80 feet apart interplanted with apples. The walnut trees are about two years old; the apples four and five.

A Speaker: I believe those apple trees will die.

Prof. Colby: That's what I want to find out. There is a great difference of opinion as to the compatibility of walnuts and other fruit trees.

Mr. Bixby: You will see at Baldwin, this afternoon, peach trees planted between nut trees. It is too soon to say what will happen but so far, it is all right.

Dr. Smith: As a matter of very great importance, how will you "round up" the forces in Illinois?

Prof. Colby: We have a number of interesting suggestions brought out in Professor Neilson's paper. He would use every way possible, including questionnaires sent out judiciously, as well as the boys' and girls' clubs, and the Boy Scouts, of which Dr. Morris speaks. The horticultural society can be of very great help. In Illinois where we have over one hundred counties, almost all of which are very efficiently covered by farm bureaus, the farm advisers are of considerable assistance. The local horticultural societies, as for instance the one with which Mr. Riehl has been so prominently connected in Alton, have helped very much in the past. The Smith-Hughes teachers in charge of agricultural teaching in the high schools can easily get in touch with promising native trees through their students. I know most of these teachers and know they will be glad to help me. I recently had a request from the Associated Press representative in Springfield to write an article on nut growing in Illinois. There is a wonderful field for development along such lines as this.

The President: It seems to me that if the agricultural colleges were asked to hand in information that might bring results, and particularly the students' work in isolated sections which would not be reached by Boy Scouts.

Prof. Neilson: For the benefit of those who did not hear my

address in 1922, I may say that I have circularized the whole county and the college stations; I have sent about 125 circular letters to the horticultural society and to its officers, high school inspectors, and to anyone I thought might be glad to get the information. I wanted to carry this further but could not. I wanted to send letters to every school teacher in the Province of Ontario and ask them to bring the matter to the attention of the boys and girls, and to offer them a substantial prize for the location of the best tree in their locality. I will say, however, that I got a great deal of encouragement from the horticultural society, the public school and the high schools.

THE SECRETARY: I will read again a sentence from Mr. Howard Spence's letter:

"The Minister of Agriculture has agreed to instruct all their inspectors over the country to make a collection of all walnuts of merit and to forward them to me for classification and identification of varieties which may be worth perpetuating."

If we could do something of that kind in the United States to enlist the extension agents, we should get some valuable information.

MR. OLCOTT: I think that a very important thing would be to send that message not only to the state experiment stations, but also to the government authorities. Why should not the Department of Agriculture make a systematic survey of that kind? Why should it be left to the small societies like this one, when the federal Department of Agriculture is so thoroughly equipped to get this? The department at Washington has expressed interest; I wonder if it would not be appropriate for this association to take some formal action, suggesting federal government action in that matter, in co-operation with the extension service, Boy Scouts, etc.

THE PRESIDENT: Will you put that in a resolution?

MR. OLCOTT: I submit the following resolution:

WHEREAS, The investigational and experimental work of the Northern Nut Growers' Association during the last fourteen years has been signally successful in improving native nuts of the northern United States, based upon discovery and propagation of superior specimens; and

WHEREAS, This work could be greatly extended with the facilities at the command of the United States Department of Agriculture, as compared with the efforts of the small number of members of this association; therefore be it

RESOLVED: That it is the sense of the Northern Nut Growers' Association, in fifteenth annual convention in New York City this fourth day of September, 1924, that the U. S. Department of Agriculture be asked to take up systematically the work of discovery and investigation of promising native nuts in the northern states and of testing selected specimens at government stations in cooperation with the authorities of the state experiment stations; such discovery to be brought about by enlisting the aid of boy scouts, school children and others, in connection with the activities of county farm agents, inspectors and other attaches of the department.

THE PRESIDENT: Prof. MacDaniels, of Cornell University will now address us.

L. H. MacDaniels, Professor of Pomology, Cornell University

It gives me great pleasure to bring you greetings from the Agricultural College at Cornell University and to express my appreciation for your invitation to address this convention concerning what the college is doing along the line of nut growing. I have a very real interest in nut growing and in this association. I like to think of it as comparable with the American Pomological Society when it started more than one hundred years ago. All of you men who are spending your time and energy in finding new facts regarding the propagation and culture of nut trees are doing pioneer work, and your names will go down in the history of nut growing in the same way as those of Wilder, Downing, and Prince have come to us linked with the early development of fruit growing in the United States. I feel confident that the work of the association will stand the test of time.

Interest in nut growing at Cornell, as you probably know, was started by John Craig who died about a dozen years ago. He was greatly interested in northern nut growing and also in southern pecans. As a result of his work we are still receiving inquiries about southern pecans addressed to Professor Craig. While at Cornell he established a course of study in nut growing which was a part of the regular curriculum. At the time, however, the actual known facts about the growth of nuts in the northern states were so few, and reliable information so scarce, that after Professor Craig's death, when there was a general consolidation of courses in the department, nut growing was combined with another course in economic fruits. Since that time, as our knowledge of nut growing has increased, more and more attention has been given to the subject. Our aim is, in fact, to give all of the up-to-date information that we

have regarding the propagation and culture of nut trees.

The nut tree plantings in the experimental orchards at Cornell have not been particularly successful. About ten years ago Professor Chandler set out about one-half acre of named varieties of pecans, Persian walnuts, black walnuts, hickories, hazel nuts, chestnuts and Japanese walnuts. These have received good care, both as to cultivation and fertilization but to date the only trees which have borne are the Japanese walnuts and these have not had good crops. Apple trees of the same age in adjacent land have been bearing commercial crops for a number of years, especially such varieties as the McIntosh, Wealthy and R. I. Greening. The climate at Ithaca is apparently rather too rigorous for most of the nut trees. Persian walnuts, hazel nuts and frequently Japanese walnuts suffer from winter injury. In the case of the chestnut, blight has practically killed all of the trees. The pecans are perfectly hardy but as yet have not borne, probably because our seasons are not sufficiently long or warm enough to grow this nut to advantage. Hickories have been very slow to become established and in fact have never made really good growth. This experience, of course, makes us feel that nut growing is really not as easy as some enthusiasts would have us believe.

In addition to this variety planting there are four or five acres of recently cleared woodland in which there are hundreds of hickory seedlings which can be top-worked. We are aiming also in this area to establish seedlings of all of the hardy nut trees to use as stocks and eventually to get a collection of all named varieties of nut trees. Grafting so far has not been particularly satisfactory due in some cases to failure of the grafts to set; in other cases to the winter killing of grafts which have made fairly good growth. Injury by bud moths and wind storms have also been detrimental factors. Our own experience together with observations upon the results of nut grafting elsewhere by experts lead us to believe that grafting of nut trees is a very difficult undertaking as compared with that of other fruit trees. It involves a knack which must be acquired by very considerable experience. I realize, of course, that new facts regarding nut grafting are being discovered almost daily and in the future we may look for better results.

The attitude of the Department of Pomology at the College with regard to nut growing is of necessity conservative. First of all, the

men in the department are trained in scientific methods and have a somewhat critical attitude when it comes to statements regarding marked success in any line. The tendency is in each case to try to find the data or the experience upon which statements are based. Unfortunately, in nut growing there are very little data upon which statements can be based. Mr. Bixby's experiments with stocks are a very good start in the right direction, and it is upon such experiments as he is carrying out that real knowledge regarding nut growing will be gained.

We have heard enthusiastic statements as to the profits which may be derived from the planting of nuts in the northern states, but I must confess that I have looked in vain both for the facts upon which such statements might be based and also for orchards which actually are profitable. If such exist in New York state I have not been able to find them even after considerable travel.

In order to be profitable, an orchard must pay all the expenses involved, including interest on the initial cost of land; the cost of labor and materials and depreciation on tools, etc. We have cost accounts covering these items on many crops such as apples and wheat, but not on nuts. It seems to me we must recognize that nut culture is in its experimental stage only. This is in fact one thing that makes it particularly attractive for the amateur.

Another reason for our conservatism is that we feel it our duty to the growers to give out statements which are based upon facts only. If a man in a northern state wants to plant ten acres of nuts what shall we tell him? Shall we tell him to go ahead and assure him that if he takes care of his trees a profitable plantation is certain. On the basis of what we know I think surely not. A hundred and one unanswered questions come up. What kinds of nuts will succeed under his climatic and soil conditions? What stocks should be used? What varieties will succeed under his conditions? Will the meats of the nuts fill out in the average season? Are the seasons long enough, etc. The fact is in most cases we do not know. In most parts of New York state we are extending a natural range of many of the nut trees and they have not been grown long enough under the new conditions to make it possible to answer these questions with certainty. On the other hand, we can tell the prospective nut grower that nut growing is in its experimental stages and under certain conditions has great commercial promise. On the basis of our present

knowledge we cannot recommend large plantations but would encourage the planting of nuts in an experimental way, especially for home use. It should be borne in mind that in the early days of fruit growing in America it was the amateur planting of varieties that laid the foundations for the present industry. If shade trees are to be planted let them be nut trees. Plant nut trees as a hobby but do not go into nut culture on a large scale for profit unless you can afford to lose.

I have great hopes for the future of nut growing in the northern states and also for this society. I am confident that new and better varieties of nuts will be found and better methods of propagation and transplanting originated so that in the future there may be a commercial industry in the north. For the present, however, I believe that conservatism is advisable, and that great harm may be done by misrepresentation. Sound growth of a northern nut industry will be built upon facts and honest experience and not on conjecture, hearsay, or even on enthusiasm, however necessary this may be. I believe that we should encourage people to plant nuts for pleasure, plant nuts as a hobby, plant them for shade and for posterity, but under present conditions not for financial profit.

The Secretary: We must adjourn at once to the lecture room, that we may hear Dr. J. Russell Smith's talk on "Nut Tree Crops as a Part of Permanent Agriculture without Plowing." He will have some interesting slides to show during his talk.

Dr. Britton has asked that we have lunch today at noon instead of one o'clock. Everyone present is invited to take luncheon at that time as a guest of the Botanical Society and of Dr. Britton, it makes no difference whether they be members or guests.

Mr. Reed: May I make the motion to extend a rising vote of thanks to Dr. Britton and his associates for the cordial and generous way in which they have entertained us?

(Motion seconded, passed, and acknowledged by rising vote).

The President: Dr. Britton, you are officially notified.

Dr. Britton: I would like to have that vote of thanks mentioned in the official record of this convention, and in the record of the Botanical Society.

The Secretary: We will see to that.

Dr. Britton: You will be interested in knowing that we have with us the very distinguished Curator of the British Botanical Her-

barium of the Royal Society. Dr. Stapf has been traveling in Canada, attending the meetings of the Royal Society there.

The President: We shall very much appreciate the opportunity of meeting him.

We will now adjourn to the lecture hall, to hear Dr. J. Russell Smith.

NUT TREE CROPS AS A PART OF PERMANENT AGRICULTURE WITHOUT PLOWING

Dr. J. Russell Smith, Professor of Economic Geography, Columbia University, New York

My first experience with nut culture was gained on the farm of a man I knew more than 30 years ago. It was a truck farm not far from Philadelphia near a boarding school which I infested and the farmer complained that I infested the farm. The farm had its fence rows and driveways lined with grafted chestnut trees bearing abundantly of large fine nuts of European origin. It was remarkable how quickly they filled my pockets. I usually succeeded in gathering them on the hundred per cent basis.

I am interested in this subject today because of an innate love of trees and because the development of a tree crop agriculture offers a way to stop soil erosion. To me the worst of all economic sins is the destruction of resources, and the worst of all resource destructions is the destruction of the soil, our one great and ultimate resource. "After man the desert" has been truly said too often of many old lands.

Soil cover is after all about the only thing that man has as a basis for the support of his life on earth. All of our food depends directly or indirectly upon plants.

In hilly countries there is usually but a thin layer of earth and rotton rock between the surface of the field and the bed rock. It is a very difficult problem to maintain this cover of earth and it is very easy to lose it. Sometimes it is lost through over-pasturing and destruction of turf, but more largely through plowing.

The nut tree is particularly effective as a part of a plowless agri-

culture which can use the soil permanently where annual crops ruin it quickly because the plow prepares the land for erosion.

The speed of soil destruction, with its erosion after plowing, is particularly noticeable with the great American crops, cotton, corn and tobacco, which require clean cultivation. Many orchards are also cultivated for the double purpose of keeping down rival plants and preserving moisture, but we pay high in soil loss for the moisture that we get by that means on hilly lands. The plow is one of the greatest enemies of the future. As a matter of fact we have already destroyed enough land in the United States to support many millions of people; and therefore the tree is the more important because it permits an agriculture that will keep the soil indefinitely, and in permanent production, without plowing.

I have accidently discovered a better way of conserving moisture than by plowing, and I have found it going on in widely scattered places and in widely different climates.

Primitive peoples in many parts of the world have long since obtained the advantage of cultivation, mainly increasing the available moisture for the tree or plant, without cultivation of the soil and the loss which follows the washing of cultivated soils. As an example I cite the Indians of Arizona, who have grown corn crops for centuries in a country with but from six to fifteen inches of rain. They do this by planting in little patches at the mouth of a gully where at the time of rain the flood water is led away into furrows and depressions so that it thoroughly soaks the ground in which the corn is planted.

My attention was first called to this practice by observing a good patch of barley in the edge of the Sahara in Southern Tunis, where the gulley flow resulting from a winter rain had spread itself out fan-like and soaked the triangular alluvial area of sand, which bore a fine crop of barley in the midst of the desert.

For centuries the olive growers of parts of Tunis have led gulley water to the olive trees where it was retained, in areas that resembled a tennis court, with a 12 inch bank of dirt around it and two or three olive trees within this area thus watered by impounding.

A practice somewhat similar to this is shown in F. H. King's classic book on Chinese agriculture, "Farmers of Forty Centuries;" but the most extreme case that has come to my attention is furnished by the Berber tribe of the Matmatas, of Tunis. These people live

on the edge of a hilly, limestone plateau, where the rainfall is less than 10 inches and in some years as low as five.

An important part of the food supply of these people is furnished by date and olive trees which they grow in the gulches of their limestone plateau. They built a dry rock dam behind which earth-wash lodges. In this the trees are planted and every rain sends more earth and soaks that which has collected. The plan can certainly not be called an experiment for the people have lived there for centuries. They have olive trees that are several centuries old and I have never seen such fine olive trees, not in California, or the plains of Spain, Portugal, France, Italy, or in Algeria or Tunis, and I have seen a good many olive trees in those countries. The olive tree is usually open, light and feathery. These in the Matmatas gulches are thick and black and rank.

For automatic cultivation and fertilization the plan of these primitive agriculturists is hard to beat. You put up your stone dam, and every time the gulley runs with water your crop is irrigated and fertilized. Can you beat it?

Three Americans of my acquaintance have independently experimented and discovered along similar lines.

The late Freeman Thorpe of Hubert, Minnesota, did it with much enthusiasm. So did the late Dr. Meyer, a friend of J. F. Jones, near Lancaster. He discovered it accidentally. He put a brush dam across a gully. Water stood behind it for days after every rain. The apple tree near it grew much more than the others. That started the Doctor. He began to dig small field reservoirs and collect water near trees and he found that it paid even with the very expensive process of hoe and shovel.

The idea has been modernized and brought to the machine stage which characterizes our present-day agriculture, by Mr. Lawrence Lee, a civil engineer-farmer of Leesburg, Va. Mr. Lee runs a level line across the face of the clay hills, and then with a Martin ditcher scoops out a terrace on this horizontal line. It makes the terrace so that the water will hold and will not run away. Mr. Lee is sure that nine-tenths of the heavy thunder shower runs off of the hills, in normal conditions of non-plowing, and that if he plows, most of the water and much of the soil go off together. He is also sure that the water pockets hold both water and soil.

Rows of apple trees planted below these waterholding terraces thrive without cultivation as well as do other trees across the row

with cultivation, but with this difference, ordinary cultivation impoverishes the soil and this enriches it by keeping all mineral and organic matter in the field.

The combination of principles worked out by many primitive peoples and also by Messrs. Thorpe, Meyer and Lee makes it possible for the farmer to arrange his rough land in tree crops so that every rain will water his crops, even though the land may be rough and in sod. If he cannot run horizontal terraces he can dig holes near the trees and lead the water to these holes by two furrows with the turning plow. This is really an automatic kind of irrigation. By this means a farmer can use his odd time whenever he can work the ground, and thus do the cultivation for a whole year or two and at the same time preserve the soil and establish a permanent agriculture.

This gives the hill land the same chance as the level lands to grow fat sods. It offers a very interesting combination of blue grass pasture along with crops of black walnuts, Persian (English) walnuts, pecans, grafted hickories, mulberries (for pigs and chickens), persimmons (for pigs and sheep), oaks (which make more carbohydrate food than corn in many situations), honey locust (which has a bean as rich as bran and good for the same purpose) and many other crop trees that will be available if good brains keep developing the idea.

In this connection it may be pointed out that France exports millions of dollars worth of Persian walnuts and most of them are grown on isolated trees scattered about the fields and along roadsides.

The President: We will now adjourn to Sormani's for luncheon and then we will immediately start for Mr. Bixby's place on Long Island.

(Adjournment).

NOTES AT MR. BIXBY'S NUT ORCHARDS AND NURSERIES BALDWIN, NASSAU CO., N. Y.

September 4, 1924

Japan walnuts (seedlings) on street set out in 1918 or 1919. All except the tree on the south have borne, 1924 being the third year for one. One of them is a heartnut.

Chinkapins raised from seed outdoors.

Black walnuts grown in pots and transplanted with a ball of earth and the entire root. Set out without cutting back and sod and vines allowed to grow around them. While they grew rapidly before transplanting they have scarcely grown since.

Beaver Hickory seedlings. These illustrate well the information to be obtained frequently as to parentage by raising seedlings. The history of the Beaver tree was ascertained four or five years ago and from this and the appearance of the tree and its nuts, it was decided to be a shagbark x bitternut hybrid. The seedlings bear this out, for they vary from seemingly pure shagbark to pure bitternut with several in between looking somewhat like the parent tree. It may be that some of these will bear nuts that will be found valuable.

Japan walnut tree killed with butternut blight.

Chestnut trees killed with chestnut blight.

Main experimental orchard. This comprises about four acres and is laid out in rows running north and south, starting at an east and west road. There are 29 trees in each row running north and south, the trees being about 15 feet apart. A nut tree is put every 30 feet and a peach or apple or some other tree that is intended to be taken out later, is put in between.

Row 1 South—(1) Niblack Pecan (5) Warriek Pecan (7) Warriek Pecan (9) Greenriver Pecan (11) Greenriver Pecan (13) Mahan Hickory (15) Marquardt (?) Pecan (17) Siers Hickory (19) Wilkinson(?) Pecan (21) Kirtland Hickory (23) Greenbay Pecan (25) Weiker Hickory (27) Burlington Pecan (29) Kentucky Hickory. This Kentucky Hickory blossomed full and some two dozen nuts set which grew to about 5/8 inches long then they dropped off. Probably it will bear next year.

Row 2 South—(4) Moneymaker Pecan (10) Pleas Hickory (24) Dennis bitternut, bearing (26) Hatch Bitternut(?).

Row 3 South—(3) Stanley Hickory (5) Ridenhauer Almond (9) Burkett Pecan (11) Hales Hickory on shagbark (13) Hales Hickory on bitternut (21) Cedarapids Hickory on shagbark (23) Cedarapids Hickory on bitternut (25) Dennis Hickory (27) Fairbanks Hickory.

Row 3A South—Seedling Black Walnuts.

Row 3B South—Seedling Chinese Chestnuts.

Row 3C South—Seedling Chinese Chestnuts.

Row 4 South—(2) Rush Chinkapin (3) Miracle Chestnut (4) Chinkapin (7) Chinkapin (8) Chinkapin (9) Champion Chestnut (10) Paragon Chestnut (13) Riehl Chestnut (15) Paragon Chestnut (16) Paragon Chestnut (17) Miracle Chestnut (22) Champion Chestnut (29) Boone Chestnut. The above trees are all that remain of a row of 29 Chestnut and Chinkapin trees most of which were bearing two years ago, from which a good many quarts of Chestnuts were gathered. Some of them died in 1922 and more in 1923.

Row 5 South—(1) Beaver Hickory (2) Hacheye (?) Persimmon (3) McCallister Pecan (4) Hayakuma Persimmon (5) McCallister Pecan (6) Kawakami Persimmon (7) Busseron Pecan (9) Busseron Pecan (10) Lambert Persimmon (11) Butterick Pecan (12) Josephine Persimmon (13) Butterick Pecan (15) Kentucky Pecan (17) Kentucky Pecan (18) Golden Gem Persimmon (bearing) (19) Indiana Pecan (20) Rush Chinkapin (21) Indiana Pecan (23) Posey Pecan (25) Posey Pecan (27) Major Pecan (28) Parry Chestnut (29) Major Pecan.

Row 5A South—Pecan seedlings.

Row 5B South—Shellbark seedlings.

Row 6 South—(1), (2), (3), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (17), (18), (19), (20), (21), (22), (23), (24) Hales Hickory, transplanted some years ago, brought from Monticello, Florida (25) Kentucky Hickory.

Row 6A North—Butternut seedlings.

Row 6B North—Butternut seedlings.

Row 7 South—Vest Hickory seedlings, Hales Hickory seedlings, Juglans cathayensis seedlings, Chinese Persian walnut seedlings, Papershell Chinese Persian walnut seedlings, Hybrid hazels (native Long Island x Italian Red 1923).

Row 7A South—Mockernut seedlings.

Row 7B South—Mockernut seedlings.

Row 7C South—Close bark pignut carya glabra seedlings. Loose bark pignut carya ovalis seedlings, Japan walnut seedlings, Adams Black Walnut seedlings.

Row 7D South—Persian walnut seedlings, Stabler Black Walnut, perfect form seedlings, Stabler Black Walnut, one lobe seedlings.

Row 7A North—Japan Walnut seedlings.

Row 7B North—Japan Walnut seedlings.

Row 7C North—Japan Walnut seedlings.

Row 8 South—8A South—8B South—8C South—Seedling Japan Walnut x butternut hybrids.

Row 8A North—Japan Walnut seedlings.

Row 8B North—Japan Walnut seedlings.

Row 8C North—Persimmon seedlings.

Row 9 South—(1) Miller Black Walnut (3) Thomas Black Walnut (4) Purple Hazel (5) Thomas Black Walnut (6) Fruhe Lange Hazel (7) Stabler Black Walnut (9) Kinder Black Walnut (11) Allen Black Walnut (13) Wasson Black Walnut (15) Peanut Black Walnut (17) Ten Eyck Black Walnut (19) Mattingly Black Walnut (21) McCoy Black Walnut (bearing) (23) Paradox Walnut (25) Ohio Black Walnut (bearing) (27) Herman Black Walnut (29) Stabler Black Walnut.

Row 10 South—(2) Stranger Heartnut, bearing (4) California Black Walnut (6) Seedling Allen Black Walnut (8) Seedling Allen Black Walnut (10) Seedling Allen Black Walnut (12) Casper Hickory (14) Casper Hickory (16) Reike Hickory (18) Vest Hickory (20) Swaim Hickory (22) Swaim Hickory (23) Jordan Almond (24) Wampler Hickory (25) Jordan Almond (26) Wampler Hickory (27) Texas Prolific Almond (29) Texas Prolific Almond.

Row 10C North—Hickory Seedlings. Here may be seen the melancholy results of not planting hickory seedlings deep enough.

Row 11 South—(1) Aiken butternut, bearing (3) Stranger Heartnut, bearing. (5) Ritchie Heartnut, bearing (7), (9), (11), (13), (15), (17), (19), (21), (23), (25), (27), (29) Lancaster Heartnut bearing.

Row 11A South—Grafted and budded black walnuts.

Row 11B South—Grafted and budded black walnuts.

Row 11C—South—Grafted and budded butternuts and Japan Walnuts.

Row 11 North—(1), (2), (3), (4), Aiken butternut (6) Juglans mandshurica (8), (10) Deming butternut.

Row 11A North—Seedling Japan walnut x butternut hybrids.

Row 11B North—Seedling Japan Walnut x butternut hybrids.

Row 11C North—Seedling Japan Walnut x butternut hybrids.

Row 12—(2) Faust heartnut, bearing (4) Deming butternut, bearing (8) Burlington Pecan (10) Rockville Pecan (20) Snyder Hickory (27) Early Golden Persimmon (28) Rockville Pecan (29) Ruby Persimmon.

Row 12A South—Grafted and budded Black Walnuts, Stabler, Ohio. Thomas & Adams.

Row 12B South—Grafted and budded Black Walnuts. Wasson, McCoy. Ten Eyck, O'Connor hybrid Witte Persian Walnut.

Row 12C South—Grafted and budded butternut & Japan Walnut. Aiken butternut, Lancaster Heartnut.

Row 13 South—(1) Franquette Persian Walnut (3) Eureka Persian Walnut (4) Early Golden Persimmon (5) Holden Persian Walnut (7) Eureka Persian Walnut (8) Grosse Kugelnuss filbert, bearing (9) Holden Persian Walnut, bearing (10) White Lambert hazel (11) Alpine Persian Walnut, bearing (12) Italian Red Hazel (13) Lan-

caster Persian Walnut (14) McFarland Chestnut (15) Meylan Black Persian Walnut (16) Hale Persimmon (17) Rush Persian Walnut, bearing (18) Imperial Hazel (19) Cording Walnut, bearing (J cordiformis x regia) (20) Early Golden Persimmon (21) Hall Persian Walnut (22) Yemon Persimmon (23) Paradox walnut (24) Yemon Persimmon (25) Mayette Persian Walnut (26) Floreams Almond (27) Holden Persian Walnut (28) Floreams Almond (29) Mayette Persian Walnut.

Row 13 North—Chinese Almond so-called, 3 years old, really an apricot with edible kernels. Has proved perfectly hardy so far.

Row 14—Grafted and budded black walnuts, Boston Persian Walnut, O'Connor hybrid Walnut, Adams Black Walnut, Alley Black Walnut, Mosnat butternut.

Row 15—Grafted and budded Black Walnuts, O'Connor hybrid, Thomas, Stabler, Ohio Persian Walnut, Minnas Zeller Italian Red Hazel, bearing.

Row 16—American Hazels from West Virginia and Ohio.

Row 17—Landesberger Lange Zeller, Buettners Zeller, Hempels Zeller, Barnes No. 6, Hazel bearing hybrid nuts, Barnes No. 5 Hazel bearing hybrid nuts, Kentish Cob, Noce Lunghe filbert, Daviana Hazels, both bearing.

Row 18—Merveille de Bollwiller filbert bearing, Medium long filbert, Like Merveille de Bollwiller, Althaldestenbener Zeller.

Row 19—Corylus californica, White Lambert filbert, Vest hazel, Grosse Kugelnuss, Hallersche Riesen filbert, Barcelona filbert, Italian Red filbert, Du Chilly filbert.

Row 20—Long Island Hazel, bearing Blueberries, 8 plants of selected varieties, Jujube, Tree hazel, corylus colurna, Vest hazel bearing hybrid nuts, Daviana hazel bearing, White Aveline hazel, tree hazel, corylus colurna, Long Island hazel bearing, Red Aveline hazel bearing.

Row 21—Corylus californica, tree hazel corylus colurna. On the southern end of these rows will be found the grafted hickories.

Row 21—Grafted Shagbark hickories.

Row 22—Grafted Mockernut hickories.

Row 23—Grafted Mockernut hickories.

Row 24—Grafted Pignut hickories.

Row 25—Grafted Pignut hickories.

Row 27—Grafted Pecan hickories.

Row 28—Grafted Pecan hickories.

Row 30—Grafted Bitternut hickories.

Row 31—Grafted Bitternut hickories.

Row 32—Grafted Bitternut hickories.

Row 33—Grafted Bitternut hickories.

Row 34—Grafted Bitternut hickory.

Additional Notes by Stenographer

This is a Royal Burbank walnut brought from California, in 1911. It stood in a yard in Brooklyn until 1917. It did not grow well there but since we have brought it out here it is growing and bearing, as you see. It is a hybrid of the California black and the Eastern black. The nut itself has not much value. The leaves are rather smaller than others. It would not compare with the propagated varieties. It is only considered as a rapid growing tree.

Here is a row of Beaver seedlings. This one is a typical shagbark. This one is like a bitternut. Every once in a while you will find a tall one with buds like the old tree. They are all Beaver seedlings from nuts gathered at the same time from the same tree.

Here are chinkapin seedlings grown out of doors. I simply threw them on the ground and covered them with leaves.

Here is a dead Japanese walnut tree. It died of a fungus, melanconium. You can see the fungus all the way down the trunk. It is a weak fungus and sometimes if the tree is nourished properly it will disappear.

This is a Lancaster heartnut. And so is this. One is much more prolific than the other. Both grafted on Japanese stock. It is bearing pretty well. It was put out in 1918.

Here is a Kentucky hickory. It had about 24 nuts, but they have fallen off.

This is a Moneymaker pecan. It is growing finely. I bought this tree from J. B. Wight, of Cairo, Ga. I also have a Burkett from Texas.

There is a Paragon chestnut which has escaped the blight. Fungus is beginning on the end of the branch, however.

Two years ago we had a whole row of these Boone chestnuts. This is the only one left. They were all in bearing then and a good many quarts of chestnuts were gathered. Some of them died in 1922 and more in 1923.

From here up, the trees are hickory (Hales) on pecans. They are ten years from the graft, and planted here from Monticello, Fla., two years ago. 23 out of the 24 trees living.

There are 12 varieties of Japanese persimmons, bought from Texas. This one shows winter-killing but will apparently live. (Hayakuma persimmon).

Here is a Jap. persimmon (Kawakami). It has not borne yet.

Here is a MacCallister pecan; originated from between the Wabash and Ohio Rivers.

Those are Thomas black walnuts; they have been out five years, and have not yet borne.

This is a Ten Eyck; it has made good growth this year and is a heavy bearer. This is a McCoy black walnut. This tree is bearing heavily this year, and bore one nut last year. It is about five or six years from the nursery. The parent tree is from near Rockport, Ind., and is a very large one.

Here is an Ohio; it came from Mr. Jones, I think. These trees are bearing heavily; they have been set out 5 or 6 years.

These trees are Lancaster heartnuts. They will probably bear heavily one year and less the next.

(Here catkins and nuts were found on the same branch, and a photograph was made).

Mr. Reed: There will probably not be any Lancaster here next spring; the late growth has devitalized the tree.

Here is a California black walnut but it has not grown very successfully.

Here is a Stranger heartnut from South Carolina, bearing.

Here is an O'Connor hybrid walnut on black walnut. The whole tree is $3\frac{1}{2}$ feet high; splendid growth for one year. The parent tree is in Maryland, about two miles from Mr. Littlepage's place.

Here is a Lancaster heartnut which has borne every year, without a stop; you see it is planted in a chicken yard.

EXHIBITS AT THE HOUSE OF WILLARD G. BIXBY, BALDWIN, N. Y.
September 4, 1924

BLACK WALNUTS
Varieties:
Adams
Alley
Herman
McCoy
Miller
Ohio
Stabler, Perfect Form
One Lobe
Ten Eyck
Thomas
Wasson
Species:
Juglans major, Arizona rupestris, Texas boliviensis, Bolivia Insularis, Cuba
The extremes of black walnut shape. Adams, long and narrow, Corsan, short and broad
Varieties: Butternuts
Aiken
Deming

BUTTERNUTS AND JAPAN WALNUTS
Varieties: Japan Walnuts
Heartnuts
Lancaster
Ritchie
Stranger
Species:
Juglans cinerea
manshurica
cathayensis
sieboldiana
cordiformis
Rough shell Japan walnut
Juglans sieboldiana x cinerea
Juglans sieboldiana x nigra
Cording, Juglans cordiformis x regia
Nuts from 4 trees on Grand Ave. Baldwin

CHESTNUTS
Varieties:
Boone
Paragon
Rochester
Morris No. 2
Morris No. 3
Species:
Chinkapin
Castanopsis

HAZELS AND FILBERTS
Varieties:
Althaldensleben
Barcelona
Daviana
Du Chilly
Emperor
Grosse Kugelnuss
Imperial
Italian Red
Merveille de Bollwiller
Montebello
Noce Lunghe
Red Aveline
Red Lambert
Rush (American)
Vest (American)
White Aveline
White Lambert
Species:
Chinese tree Hazel (Corylus chinensis)
Constantinople Hazel (tree corylus colurna)
Thibet Hazel (Corylus tibetica)
Hazel Blight (Specimen)

HICKORIES
Varieties:
Beaver
Brooks
Dennis
Fairbanks, Parent tree
Grafted tree
Galloway
Glover
Griffin
Hales
Kirtland
Laney
Milford
Pleas
Siers, Parent tree
Grafted tree
Vest
Weiker, Parent tree
Grafted tree
It will be noticed that nuts from young grafted trees are generally larger than those from the parent trees

Species and Hybrid:
Arkansas Hickory, carya buckleyi Arkansana
Bitternut, carya cordiformis, Dennis, Hatch
Buckley Hickory, carya Buckleyi
Chinese Hickory, carya cathayensis
Pallid Hickory, carya pallida
Shellbark, carya laciniosa, from 3 locations
Water Hickory, carya aquatica
Zorn, the largest hickory yet found, carya buckleyi Arkansana x alba

PECANS
Northern Varieties:
Burlington
Busseron
Butterick
Campbell
Greenriver
Indiana
Koontz
Major
McCallister
Niblack
Norton
Posey
Witte

Species and curiosities:
Seedling Pecan from Adams, Ill. The most northern native growing pecan yet seen by Willard G. Bixby
Curtis Pecan, without inner shell partition
Schley Pecan, one grown in Georgia, the other in southern Pennsylvania. This shows how the nuts are dwarfed by lack of sufficient summer heat

PERSIAN WALNUTS
Varieties:
Alpine
Boston
Colona
Franquette
Hall
Holden
Hutchinson
Lancaster
Mayette
Milbank
Ontario
Pomeroy
Rush
Sayre
Witte

Seedlings and Hybrids
Chinese Paper Shell
Juglans regia x cinerea from 2 locations
Allen, juglans regia x rupestris

MISCELLEANEOUS
Almond, Ridenhauer
Chinese (edible apricot)
Beechnuts, American (2 locations)
European
Queensland Nut Macadamia ternifolia
Water Chestnuts:
Nelumbium Luteum
Nelumbium Speciosum

NOTES TAKEN AT MERRIBROOKE, DR. MORRIS' ESTATE NEAR STAMFORD, CONNECTICUT

Excursion of Friday, September 5, 1924

Arriving at Stamford, all guests and members were met at the station by cars from Dr. Morris' place. After coming together at the house, the members followed Dr. Morris to the main gateway, where the following program commenced:

Dr. Morris: If you will all follow me here inside the gateway we will take the trees as they come in the order of the mimeographed sheet which you hold.

I will first say that the abnormalities at Merribrooke this year

were three in number. First, a destructive invasion of the tent caterpillar which attacked nearly all kinds of trees during its traveling stage. Then came a canker worm invasion with partial or complete defoliation of even the forest trees. Almost all of the whole leaves on any tree represent the second set for the season. Then came a drought said to have been the most severe since 1871. As a result of these three influences most of the fruit trees and nut trees dropped their crops this year.

Among the many introduced and grafted trees at Merribrooke only about one hundred typical forms have been tagged for this occasion. The large tags on the trees represent types, the smaller tags represent different variations of the type. Numbers on the tags correspond to numbers on this list.

We will begin with No. 1—Original Taylor Shagbark hickory. Nut large, thin shelled, good cleavage and high quality. This is practically an annual bearer. The weevil likes it because it is very thin-shelled. Consequently we seldom get a good crop. Most of the trees were defoliated. This is the best all-around hickory that I have found. I gave prizes for years and got seedlings from all over the country, and this is the best one that I obtained growing right here at my gate. It is defoliated by both the tent caterpillar and the canker worm.

2. Buckley Hickory from Texas. Nut large, round, thick-shelled, peculiar flavor and fragrance. This hickory was first described in 1872 in Texas and then it was forgotten. Dr. Sargent was quite surprised when I told him that I had one for the variety really passed out of history among the botanists until the past two years. The bark is deeply ridged in the older trees. The tree has been crippled by the twig girdler this year.

3. Carolina Hickory Seedling (scaly bark hickory). Nut small, thin shelled, sweet. I think this is one of the most beautiful hickories we have. It has been crippled this year but not enough to hurt. It has a small, thin-shelled nut with sweet flavor. The older trees have the scale on the bark.

4. Carolina Hickory grafted upon other local wild stock, and I do not know whether it is macrocarpa or pig-nut.

5. Shagbark top-worked to Vest variety of shagbark from Virginia that Mr. Bixby described yesterday as having a shell so thin that it could be cracked with the hand.

6. Shagbark top-worked to Carolina and Kentucky varieties. Note the different foliage, and smaller leaves. Here is a graft of three hickories on one stock.

7. Shagbark top-worked to Vest shagbark above and to McCallister pecan below. The foliage of this McCallister would justify putting the tree in any grounds; but here on the shagbark stock the

leaves are not so large. The foliage on Mr. Bixby's was large and beautiful.

8. Shagbark top-worked to Brooks shagbark. That tree prolongs the name of one of our audience into history.

9. Asiatic Winged Walnut (Pterocarya fraxinifolia). I think this would be valuable for hybridizing.

10. Grafted Woodall American (black) walnut. Nut small, thin shelled. Tree very prolific. This tree has not yet borne, but it should next year. I got that from a man near Milford, Del. The nut is thin-shelled and cracks very easily.

11. Grafted Lutz American Walnut from North Carolina. This tree is about six years from the graft. The nut is large.

QUESTION: When do you have frosts here at Stamford?

DR. MORRIS: The frosts are from about the middle of September until sometime in May. Sometimes we miss the September frosts.

12. Korean Nut Pine. Furnishes important food supply in northern Asia.

13. Grafted Papaw. Larger part Ketter variety. Prize fruits have weighed about one pound each. Smaller part Osborn variety No. 3, a choice kind.

14. Seedling Papaw.

15. Seedling Papaw, christened "Merribrooke prolific" with clusters of fruit of the first year's bearing. Five bunches on the tree and it is the first year out from the nursery. It is a very beautiful tree for the lawn.

The growing season of pawpaws is so long that a hard September frost may catch the fruit before it is ripe in this locality. Fruit will stand a light frost only.

16. Chinese Pistache seedling. Tree beautiful but nut too small for the market. May serve for hybridizing purposes. The autumn foliage of this tree is very wonderful.

17. Grafted Wolfe persimmon. Ripens fruit in July or August. This is an ordinary size fruit but the peculiarity is that it ripens before the others do.

18. Grafted Cannaday seedless persimmon. You see another member of our party has gone down to fame with this Cannaday seedless persimmon.

19. Stanley shellbark hickory grafted on shagbark stock.

20. Stock grafted to Kentucky shagbark.

21. Jeffrey Blue Bull Nut Pine. Nuts small, thin-shelled, rich. Eaten shell and all by the natives. This is one of the most beautiful of pines. In the top of the tree is placed one of the large gourds which I raise here on the place. I place these gourds in the tree-tops for bird-houses. All kinds of birds nest in them, from the chickadee to the barred duck. A squash may be used for this purpose as well as a gourd.

I raise the pines from seed.

22. Torrey nut pine from southern California. Nut is large, and has a fine flavor. I get my seeds from Bartner Brothers. Pines do not do so well near cities. The sulphites in the air are picked up by the pines and this kills them. This particular pine is a surprise to all botanists who have seen it; it is native in California and is one of the disappearing pines. I have had five of them and I raised them all from seed.

23. Chinese hazel. Grafted on common hazel and outgrowing it, The Chinese hazel makes a tree from 80 to 100 feet in height. This is the first year this tree has borne. It is grafted on common stock, and is beginning to bear earlier than it would have done on its own roots.

24. Butternut parthenogens. Some are large and some small but all are grown under the same conditions. That one was defoliated by the canker worm and then by the tent caterpillar and this is the fourth set of leaves it has put forth this year.

25. Hybrid walnut (Siebold x butternut) four years old.

26. Grafted American walnut. Peanut variety. Only one chubby half of kernel to each shell. The scions were sent here from Washington, D. C.

27. Mediate shagbark grafts (Cook variety). Grafted July 10 in midst of great drought. Compare this with the trees you will see farther on in the walk, grafted near the end of the drought. I do not have much trouble with the plain splice graft and I expect it to start ten days after I put it in.

Here is the way I treat a borer, although I have two or three ways of doing this. First I find a hole on the tree, like this one. Then I follow down to where the borers work. I cut that part away, inject chloroform and fill up the opening with common kitchen soap.

28. American Chestnut. Merribrooke variety, root-grafted on Japanese chestnut. I grafted that very low, below the ground. It is the best chestnut I have among several thousands that I planted. This tree was one of the first to go down with the blight, but I have grafted on other scions and have kept it going ever since.

29. Dresher chestnut (European origin) grafted on Japanese chestnut. The graft is about three years old. It has borne since the first year. There are several nuts on it now.

(Now we must be careful of the sharp stubs in the woods. These are newly cut brush paths, and all guests wearing low shoes should step carefully).

30. Stanley shellbark hickory, grafted on pignut hickory. Mr. Jones introduced this hickory.

31. Kentucky shagbark grafted on shagbark stock, with bark slot graft. I let another twig grow from the same lead for nourishment. I put in three grafts here two of which are dead. I do not quite approve of that method. I prefer now to go up to the small branches and then splice-graft on small branches.

32. Marquardt pecan grafted on stock of pignut. It does well on this hickory.

33. Hardy, hard-shell almond.

34. Woodall American walnut. This shows that the Woodall black walnut grows fairly well on butternut stock.

35. Shagbark hickory top-worked to Marquardt pecan.

36. Staminate persimmon trees.

37. Bony Bush filbert, grafted on common hazel. (Bush badly cut up by girdler beetle. Elaphidion. Five nuts on the bush).

38. Purple hazel. Look sharp to find the 20 nuts on this bush. This tree is about 5 years old.

39. Four large bitternut-hickory trees, top-worked to Beaver hybrid. Beaver branches distinguished by larger leaves and fewer leaflets. Stock shoots will be cut out gradually, allowing Beaver to have entire tree finally.

40. Bitternut hickory top-worked to Marquardt pecan.

41. Hybrid walnut. (Siebold x Persian). Tree riddled by walnut weevil every year hopelessly.

42. Taylor shagbark hickory grafted on shagbark stock. I fill the cavities with paraffin and turpentine. There are three or four nuts left in the top of the tree. The tree has borne nuts for three years.

43. Pinus edulis.

44. Marquardt pecan on bitternut.

45. Dead hybrid hickory, grafted to Beaver hybrid. Grafts made enormous growth in first year—10 feet for some grafts. All blew out in one minute of hurricane in advance of thunder storm.

46. Bartlett hazel grafted on common hazel. There are a number of dead ends, caused by a small worm you can hardly see.

47. Chinese chestnut. Blighted at foot of trunk but the tree continues to bear.

48. Garritson persimmon. Best of all varieties called seedless, but the large staminate tree nearby spoils that feature. It is about five years old, and bears very regularly and heavily. The stock came from Mr. Jones.

49. Early Golden persimmon. Carries one graft of Everhart seedless variety on lowest large branch.

50. Hybrid walnut. Juglans nigra. I do not remember which parent I used.

51. Pignolia nut pine. *Pignolia pinea.* It is a seedling. You can buy pignolia nuts in Europe for food everywhere.

52. Hardy soft-shelled almond. I do not know the variety as the label is lost; but the tree was put there about 3 or 4 years ago. It came from the Government.

53. Deming purple walnut. I think Dr. Deming can best tell you about this.

Dr. Deming: It grows on the side of the road between Norwalk and Danbury, where the very large black walnut tree is, 15 feet in cir-

cumference, said to be the largest in Connecticut. This purple variety has nuts with a brownish red involucre showing sharply against the green leaves. The young foliage is purplish red, and the cambium and the pellicle of the kernels are purple. It is a very fair nut and the tree is very striking when it starts in spring with the beautiful tufts of leaves.

Dr. Morris: It may be a valuable wood for cabinet-makers. Every part of the wood is purple. There are two purple trees. The smaller tree is evidently a seedling of the larger.

54. Young Major pecan.

55. Webb Persian walnut on American walnut stock. The nuts are enormous and of Alpine type of good quality. You saw some of these yesterday among those brought in by Prof. Neilson. You sometimes see these in the French market where they are called "Argonne." I picked this up in Greenwood. It has many nuts this year and this is the second crop of leaves.

56. Busseron pecan. This had a full crop of flowers this year, both staminate and pistillate.

57. Appomattox pecan, from the James River in Virginia. This and four other kinds of pecans would have borne nuts this year excepting for defoliation. It is a handsome tree and will bear next year.

58. Seedling filbert. About six years old.

59. Daviana filbert from Europe. Many people call them "hazels," but I think we should call them "filberts."

60. Josephine persimmon. It has borne heavily every year except this year. It still has some leaves left. Some people are very fond of the fruit. I do not like that as well as the Garretson. It is a big persimmon and a very good one. The fruit stays on until late November and December. I think the Garretson is the best persimmon I have ever had.

61. Lambert persimmon. Largest fruited American kind.

62. Japanese persimmon, planted between the rocks for protection from wind in winter, and from heat in summer. Hardy now for two years but of slow growth.

63. Beaver grafted on bitternut.

64. Weiker hybrid hickory on shagbark stock.

65. European filbert grafted upon common hazel stock. The squirrels have lived on it. I can count 7 nuts left. I made grafts more than a foot long. It was planted three years ago. I could show you several hundred trees bearing heavily this year, and on all of them we lost the first crop of leaves.

66. Beaver grafted Nov. 5, 1922, on bitternut.

Dr. Zimmerman: Will they live when grafted at any time throughout the year?

Dr. Morris: I would not be afraid to graft anything at any time of the year.

67. Taylor shagbark grafted July 21, 1924. Probably mockernut

stock. Growth slow but sure.

68. Wild beak hazel. Nuts not so good as those of common hazel.

69. Bitternut top-worked to Beaver.

70. Hazel, patch-grafted here and there with Bony Bush filbert. The larger and darker leaves are Bony Bush.

71. Leonard shagbark grafted on stock probably shagbark. Nut very small, thin shelled, highest quality and keeps for four years without becoming rancid.

72. Shagbark top-worked to Taylor variety, but only a few grafts. Too much work for a tree of this size.

73. Pleas hybrid pecan on butternut stock.

74. Bitternut top-worked to Beaver.

75. Here is a very interesting object lesson. No. 74 is a bitternut top-worked to Beaver, and all doing well. The same day, with the same graft, I top-worked this pignut. The pignut refused the graft and died insulted. But another stock from the same root accepted Marquardt.

76. Bitternut stock accepting Marquardt pecan tardily.

77. Here is another form of borer. I treat them in this way: Cut away a little of the hole, pour in the chloroform and stop up the hole with soap. That will kill all of the borers in the tree.

78. Grafts of Laney hybrid hickory on bitternut.

79. Group of four filberts—not blighting, but not thriving this year or last. Reason unknown. Soil is heavy clay hardpan near top. Top swampy in spring.

80. Taylor shagbark on bitternut.

81. Taylor shagbark on shagbark stock.

82. Bitternut grafted to Lucado pecan. Grafts grew well for two summers, but died in second winter.

83. One poor graft of pecan on bitternut.

84. Pleas hybrid pecan.

85. Merribrooke chestnut grafted upon Chinese chestnut sprouts.

Dr. Zimmerman: Have you been able to bud chestnuts successfully?

Dr. Morris: Yes.

86. Daviana filbert.

87. Hybrid hazel. (*Colurna* x *Americana*).

88. Avellana hazel. Variety *Contorta*.

89. Siebold walnut. *Parthenogen*.

90. Hybrid chinkapin. (C. pumila x C. dentata). Grafted to another hybrid, but stock now blighting.

91. One of a series of chinkapins, natural or hybrids, grafted over to other hybrids or to the Merribrooke variety of American sweet chestnut. Some are blighting.

92. Original Bony-Bush hazel. Blighting moderately. Treatment for blight not followed because of wish to note the degree of resistance.

That bush was named by Dr. J. Russell Smith. The nut is remarkably thin shelled, very long and curious in form.

93. Chinkapin, not grafted. These bear heavily every year notwithstanding the blight. From the same root common chinkapin will keep on bearing year after year. When one stock blights another takes its place so that heavy continuous bearing is the rule.

94. Original No. 1 Morris hybrid chinkapin. (C. pumila x C. dentata). Nuts of size and quality of American sweet chestnut. Tree blighted in its 13th year after bearing crops for 8 or 9 years. New stump sprouts now growing.

(Note: At this time, the guests were called to the lawn back of the house, where a luncheon was served by Mrs. Morris. The tables were laid sumptuously, and all enjoyed it the more because of the surroundings, where trees on one side bent over a clear trout-stream, and elsewhere old-fashioned gardens splashed colors over the green background.)

BUSINESS SESSION
Held on Third Day

(Note: It was planned that this session should be held during the afternoon of the third day, after the trip through Dr. Morris's estate. However, while the members were exploring deep in a wooded portion of Merribrooke, a sudden downpour of rain occurred. The nearest shelter was found to be the barn, where the members agreed that the following session should be held, since it was not possible to reach the main house. All members were standing during the session, including the reporter who wrote with the notebook resting against one of Dr. Morris's ears.)

Session called to order by President Weber.

Dr. Smith: There should be added to the by-laws the following amendment:

Article V. Members all be sent a notification of annual dues at the time they are due, and if not paid within two months thereafter they shall be sent a *second notice*, telling them that they are not in good standing on account of non-payment of dues, and are not entitled to receive the annual report.

At the end of thirty days from the sending of the second notice, a *third notice* shall be sent, notifying such members that unless dues are paid within ten days from receipt of this notice, their names will be dropped from the rolls for non-payment of dues.

The President: The motion has been seconded; all in favor please signify by saying "Aye."

(Vote carried unanimously).

The Secretary: The association should have a fiscal year. Shall we discuss this or will the president authorize the secretary and the

treasurer to agree upon a date most convenient to them for the beginning of the fiscal year?

Mr. Reed: I move that we leave this to the discretion of the secretary and the treasurer.

The President: All in favor of the motion, please signify.

(Voted as presented).

The Secretary: I move that combination membership in the Association with subscription to the American Nut Journal be $4.50, a deduction of 25 cents each by the Association and the Journal.

The President: All in favor of the motion please so indicate.

(Motion carried).

The Secretary: The next thing is to elect new officers.

The President: Mr. Reed will please read the report of the Committee on Nominations.

Mr. Reed: The making of this report was one of both great pleasure and of extreme regret. Since Dr. Deming has found that it will not be possible for him to continue as secretary, the following names are offered:

President—Harry R. Weber.
Vice-President—Mrs. W. D. Ellwanger.
Secretary—Mrs. B. W. Gahn.
Treasurer—H. J. Hilliard.

The President: Are there any exceptions to this? Will those who are in favor please so state?

(Election carried unanimously).

Dr. Smith: Dr. Deming's retiring from the secretaryship is a matter which all old-timers will regret, and I want to move that this association record in its proceedings the fullest appreciation of his great and faithful service in helping to carry the organization through so many years. I do not know what we would have done without his service and it is with great regret that we see him step aside.

(Motion seconded and unanimously carried).

Dr. Deming: I wish to express my gratitude to the members for their kindness, but I also wish to say that although I have stepped aside, I have not entirely passed away. I am still with you and I shall always give the association the best of my efforts in whatever way they may be needed; its interests shall always be dear to me.

Dr. Morris: It seems to me that we have an object lesson here. Excepting for Dr. Deming's efforts I doubt whether this organization could have held together and worked harmoniously during its years of

existence. He has been the key-note of the work with which others have helped, and we have been successful because of concerted work on the part of a number of men who are looking forward to the great future of this new agriculture, this new source of agriculture for the entire world, wherein we are going to be able to depend upon the subsoil for our sustenance. It is through untiring work and self sacrifice that those who are so interested in this work have been able to work as a mass unit. I do not know of anything more that I could say.

The President: I am sure that we all regret to see Dr. Deming step aside, but we will still have him with us and I am very sure that he will do all possible for the good of the association always.

Dr. Deming: I stated a few moments ago that although I had stepped aside I had not passed away; but since then I have changed my mind. I believe that I have entirely passed away.

Dr. Smith: I move a resolution of great appreciation for Dr. Morris's and Mrs. Morris's hospitality to us, and for enabling us to enjoy the beautiful day we have had here.

(Motion seconded and unanimously passed).

The President: Dr. Morris, you now have notice of the official action of the association in their desire to thank you.

Dr. Morris: I thank you, but I must say that I have had very little to do with it; I may have made the suggestion, but the women always do all of the work and in this case my wife and daughters have done it all.

The President: We have not yet decided on the place for our next convention. I would like to have your ideas.

Dr. Morris: I had three ideas as to that; one is to go to Mr. Riehl's place next year. Prof. Colby said that if we should, he would assume the responsibility of the committee on arrangements. We are first to ask Mr. Riehl whether it would be in accordance with his ideas and wishes.

The second idea is this. We saw yesterday only a small part of Mr. Bixby's exhibit, one of the finest collections in the world. We should have to spend more than a day there to see it satisfactorily. In connection with a visit to the Hick's nurseries, and others in the vicinity, it would take more than a day.

The third idea is to go again to Lancaster to see Mr. Jones' nursery and other things in that vicinity. It seems to me that we must make a choice between these three.

Mr. Jones: I would be very glad to have you come to Lancaster.

Dr. Morris: The objection to that is that Mr. Riehl is now 86 years of age. In view of that our first choice ought to be Mr. Riehl's place.

Dr. Smith: I move that, if it prove acceptable to Mr. Riehl, we meet in western Illinois.

Mr. Jones: Why not add, "If that is not satisfactory, to go to Lancaster?"

Dr. Morris: We should go back to Long Island next year and complete what we did not see this year, if we do not go to Mr. Riehl's.

The Secretary: The Secretary has received from the St. Louis Chamber of Commerce an invitation worded with rather more cordiality than usual to hold our next convention in St. Louis. They offer to provide a meeting place, speakers, publicity, to do all except give the cash prizes and entertainment. I do not know exactly how far St. Louis is from Alton, but I understand it is one hour's ride by rail.

Mr. Reed: We could also see the Botanical Garden and the collection of large trees.

The President: I think the sentiment is in favor of the western meeting. We can easily get to Mr. Riehl's place from St. Louis.

Mr. Reed: It is 22 miles from St. Louis to Alton, and there you can change and go to Mr. Riehl's. I think it best to go to St. Louis for the convention and to take a day at Mr. Riehl's place.

The Secretary: As to the date we would not be able to decide upon that without first consulting Mr. Riehl and learning the time convenient for him. However, we should express our opinion as to the best time, approximately.

Mr. Reed: I believe it would be to the advantage of the organization to go there at a time when the nuts are on the trees. We have seen the species and varieties in bearing, but we have not seen a paying orchard ready for harvest. I believe we should have the meeting about September 10, or a little later.

The President: Then we will move that the convention next year be held at St. Louis on September 10, or a little later as may be decided by the Executive Committee after consultation with Mr. Riehl.

(Motion put, voted and carried).

Dr. Morris: Another important matter is in regard to publicity. For this meeting I have sent notes to about 15 different publications, expecting that they would give us notices. Not a single one of them gave

us notices. This morning one of the reporters called me and said he was sorry he could not be here as he had an important meeting to attend. He wanted to know what the Northern Nut Growers' Association was like, if it was something like the Tree Planting Association. The fact is that people do not understand, as yet, the meaning of this association or its purpose. They do not realize that California sends 25,000 tons of walnuts to market, worth millions of dollars, and 10,000 tons of almonds this year. They don't realize that down in Georgia, in the poor, puny pinewoods where men had a hard time to make a living at one time, they are now riding around in limousines because they are growing nuts. They do not realize the enormous social and economic importance and consequence of work of the nut growers of today in the part that they play in the agriculture of the world for tomorrow. The newspapers would rather send some representative to see a prince fall down with his horse. But I know from mutual acquaintances that the Prince would rather be with us here today at this meeting than to be listening to a thousand and one nonentities and taking part in conversations with no future meaning. I believe that if I had thought about inviting him in time I should have had him out here. I have had experience with members of royalty before and I know what serious-minded people they are.

The next subject discussed was that of dropping members who are not in general good standing. After the discussion the decision stood that no action could be taken unless specific charges against the member were presented and proven true.

Another matter discussed was that of compensation to Mrs. Gahn for doing secretarial work for the association. It was voted by those present that she should be compensated, but the amount of compensation should be left to the decision of the Executive Committee.

The President adjourned the session sine die, at 4 p. m.

Because of lack of time, several papers were not read. These are included herewith:

NUTS

By Hon. Royal S. Copeland, U. S. Senator from N. Y.

Whenever there is a peculiar individual in the community, he is apt to be called a "nut." As ordinarily used this is a term of derision, but the more one studies the value of the nut the more he

is impressed with the idea that this isn't a good word to apply to an abnormal individual, unless he happens to be abnormally good. The nut is one of the best of the products of nature. It is one of the oldest of foods, and among certain animals it is almost the only food depended upon for health and growth.

If Mr. Bryan is mistaken about the origin of man, and if his antagonists are right, the natural ancestors of the human race were all nut eaters. At least the gorillas and chimpanzees are fond of the nut. When we go back to the early history of the Greeks and the early inhabitants of Great Britain, we find that they depended largely upon the acorn for food.

When measured by the caloric method it is surprising how much richer in nourishment the nut is than almost every other food substance. Nuts average about ten times as many calories per pound as the richest vegetables.

It makes you hungry to hear the names of the nuts. In this country we have the walnut, butternut, hazel nut and the hickory nut, the chestnut and the beechnut. These are native to our land. Then there are cultivated orchards of Persian walnuts, pecans, almonds and peanuts.

Christmas and Thanksgiving would be a failure without nuts; they are a part of the hospitable fare and no stocking is well filled at Christmas time unless a handful of nuts is added to the surprises.

Isn't it amazing what popular ideas there are in existence about the digestibility of foods. Many of these are fallacious. For instance, it is common belief that nuts are difficult to digest. This is not well founded. Of course nuts like all foods which are used as a part of the dessert are considered merely as an addition to the meal, and not a part of the meal structure. You finish your meal, having eaten everything you need and having filled your stomach, then you are given a dish of ice cream and, perhaps, after that the nuts are passed. They taste so good that you are tempted to take one more about ten times. You fail to chew the nut thoroughly and you crowd it into an already overfilled stomach. Because it happens to be the first thing to come up in case of disaster you jump at the illogical conclusion that your indigestion is due to the nuts. I need not tell you how unscientific is your conviction.

Several varieties of nuts are used for the making of nut butter, and this food is a very excellent substitute for meat.

Certainly nuts have material advantage over a good many foods. They keep indefinitely. They never putrefy. They are not infested with harmful bacteria. You can never get tape-worm or any other parasitic trouble, which occasionally follows the eating of infected food.

I am glad there are societies organized to propagate the nut. A prominent concern of New York City is very active in promulgating the value of the nut, and is encouraging the planting of nut trees.

Somebody has estimated that there are three million miles of country roads, and that if nut trees were planted alongside these roads there would be enough protein food for the entire population.

Nuts are rich in protein, lime, iron and vitamins.

Many dishes may be made from the nut which have the appearance and flavoring of meat, without the objectionable effects of flesh diet.

Last year we imported twenty-five million pounds of almonds, forty million pounds of Brazil nuts, eighteen million pounds of filberts, and forty-four million pounds of walnuts,—about twenty million dollars worth of these nuts were brought into the country.

This shows that there is some appreciation certainly of an article of food which deserves to be even more commonly used than it is at present.

HARDINESS IN NUT TREES

By C. A. Reed, U. S. Department of Agriculture

Nut trees of most species commonly thrive at both latitudes and altitudes much greater than the limits of regular or even frequent crop production. This fact is seldom fully appreciated by prospective planters, particularly in the North, who, not unnaturally, assume that the presence of a group of vigorous appearing trees, or even of a single tree, particularly in a fruitful year, is sufficient evidence of local hardiness to justify commercial planting. However, practically all of our native species of nut-bearing trees are indigenous well beyond the range of regular crop production. This is made possible by occasional seasons favorable to seed production which enable such species to reproduce themselves. A crop once in a quarter century would be sufficient for this purpose.

Taking the pecan as an illustration of how a species may be affected by latitude, it has been found that, as the limits of hardiness are

approached, the ill effects on the species in approximate order are:

(1) reduction in size of nut, especially with oblong varieties in length,
(2) increased proportion of faulty kernels,
(3) increased irregularity of crop,
(4) practical crop failure, and lastly the
(5) partial, then complete, destruction of the tree.

On the other hand, the fact that a tree is subject to occasional winter injury, or that it bears irregularly, or not at all in a particular site, is not necessarily to be taken that the same tree in a different site or under slightly changed environment would not perform satisfactorily, even in the same locality. A change in exposure or of cultural treatment, or of rootstock, or of variety, or a modified association of varieties, might and frequently does bring about entirely different results. Sometimes a southern exposure causes trees to respond to mild weather, in winter or early spring, and to be caught by subsequent, violent drops in temperature. Some of the best known and best performing Persian walnut trees in the East are on a northwestern exposure, yet the species is commonly not hardy in the temperate portions of this country.

To a certain extent the ability of orchard trees to withstand frost injury is subject to control. The danger is greatest with trees which have grown late or those which have become devitalized for some reason or with those which are in poorly drained soils. The kind of root stock which has been used, is known to have had an influence in some cases. Doubtless this will be better understood as different stocks are used by the leaders in pecan breeding. Varieties also are known to differ greatly in their degree of hardiness. However, failure upon the part of otherwise normal trees to bear paying crops with regularity is not necessarily due to low temperatures. Other factors, such as self-sterility, may be wholly responsible for at least the lightness of crops.

So far as the orchardist is concerned, a tree is not hardy unless it is capable of bearing crops the average of which are profitable. On the other hand, occasional winter injury does not prove that a species cannot be grown successfully in the same locality. Neither the peach nor the apple industries of the North nor those of the citrus in the South and California nor, in fact, any of the other horticultural commodities of this country are wholly unaffected by frost damage. Our forest trees may be more subject to winter killing than we suspect. A certain amount of winter-injury is to be expected in any part of the country no matter what the species of plant may be.

The frequency with which winter or spring injury is definitely known to occur gives color to a rising theory that freezing temperatures may play a vastly greater part in the development of the nut industry over the entire country than is commonly supposed. Much of the evidence of damage from this cause is of such nature as to be easily over-looked or attributed to other causes. Trees and plants of many kinds have become so accustomed to injury by freezing that they are able to recover without the injury always being apparent. A few illustrations of this which have come to the writer's attention might be cited.

In December 1919, a sudden drop in temperature of from 32°F to 24°F occurred at McMinnville, Oregon, with fatal result to cultivated trees and shrubs of many kinds. The damage was greatest in flat bottoms, especially those where neither land nor air drainage was good. Under such conditions, numerous apple orchards were killed outright. Prunes and Persian walnuts were so badly injured to the snow-line that subsequently great numbers of trees were cut down. Both staminate and pistillate buds of filberts above the snow were practically all destroyed. Later on, the entire tops of many of the older-bearing filbert trees succumbed. An instance of particular interest, in so far as this discussion is concerned, was afforded by the behavior of a shagbark hickory tree in McMinnville, some 20 or 30 years old, which had been grown from a Missouri seed. In February, when examination was made of the condition of this tree, it was found that all visable buds had been killed, yet the bark on the branches between the buds was in apparently perfect condition. The question as to what the tree would do, therefore, became one of great interest. The following September, when revisited, this tree was found to have such a wealth of luxuriant foliage that the observer felt that the accuracy of his February records was challenged. However, closer inspection showed that growth had entirely taken place from adventitious buds, and that the dead buds and spurs were still in evidence. There were no nuts on the tree but otherwise the casual observer would not have suspected that the tree had been affected in any way. In all likelihood, the owner of the tree would deny that it had been injured.

Another case of somewhat similar kind occurred early during the present year in a pecan orchard in South Georgia. The trees had been set in 1917, and in 1919, a portion selected by the Bureau of Plant Industry for conducting a series of fertilizer and cover-crop experi-

ments. The summer of 1923 was extremely dry. This was followed by warm rains in the late fall and early winter. On January 6, during a period of high wind, the mercury dropped to within a few degrees of zero, official reports recording temperatures of from 6 to 8 degrees above zero at various nearby stations.

On March 31, Dr. J. J. Skinner, of the Office of Soil Fertility Investigations, in attending to the spring fertilizer applications, discovered that a high proportion of the trees had been badly winter injured, as indicated by the usual characteristic evidence. These included a considerable exudence of sour and frothy sap from the trunks of the trees, particularly those having smooth bark. This invariably occurred on the west side. Shot-hole borers, which not infrequently follow such injury, were already at work.

This situation was at once called to the attention of the owner of the orchard who lived some 50 miles away. He replied that although he made frequent visits to the orchard, the matter had not attracted his attention, nor had it been reported to him. On April 17, he inspected the orchard and the day following, reported to the Bureau by special delivery that as a result of a rather hasty inspection, he was convinced that from 16 to 20 per cent of the trees in the experimental tract were injured, but that in the rest of this orchard the injury was insignificant, probably not exceeding 4 per cent. His not unnatural deduction was that the high fertilization of the soil in the experimental tract had caused tender growth which, under the extreme conditions of the previous months, had been unable to survive.

On April 24, a careful record of the condition of all trees in this tract and of a representative number of those in adjacent parts of the orchard, was made by Mr. J. L. Pelham of the Bureau of Plant Industry and the writer, in company with the owner of the orchard and his superintendent. It was found that in the experimental tract, 50 per cent of the trees had been visibly injured, thus exceeding the owner's maximum estimate by about 30 per cent. Of the total number of trees, 20 per cent were regarded as being slightly injured, and 30 per cent severely so. Of the fertilized trees within the experimental tract, 55 per cent showed injury to some degree as compared with 58 per cent of the trees unfertilized, also within the tract.

Inspection of the trees outside of the experimental tract showed that 52.6 per cent were affected, 40.8 per cent being slightly, and 11.8 per cent severely injured. A second inspection made June 9 showed

that while a few of the most severely injured trees had succumbed, the apparent condition of the majority was greatly improved. In the experimental tract 6 per cent were dead, 13.50 per cent in doubtful condition, and 80.25 per cent were apparently in good condition. Of the trees in outside tracts, the percentage dead, doubtful and apparently sound were 2.80, 9.008 and 87.42, respectively.

The lesson of present importance from this narrative is that afforded by the illustration not only of the ease with which the matter all but escaped the attention of a careful grower but of the difficulty of even impressing upon him the full gravity of the situation. In spite of a prejudice which he conceded was in his mind, when he first inspected the trees on April 17, he underestimated the number affected by from one-third to one-half.

This grower was not alone in his failure to detect evidence of winter injury as was subsequently proven by the negative replies to a general inquiry to growers in many sections sent out in May, together with numerous reports of severe injury received during June and early July. The fact is that winter injury was more or less general in the pecan orchards of much of the South. Had it been possible to observe further, it is highly probable that a direct relation would have been found between this damage and the lightness in the set of the crop of nuts in 1924 over the general pecan district.

Other instances of damages to nut trees which have largely escaped notice might be cited, but these will perhaps be sufficient to call similar cases to the minds of other observers. Of particular interest in the northern part of the country are specific instances of the behavior of individual species and their varieties with reference to ability to withstand local climatic conditions. To cite a few: Mr. E. A. Riehl, of Godfrey, Ill., 8 miles from Alton, reports that during his 60 years of residence on a high bluff overlooking the Mississippi, the pecan trees in the river bottoms of the immediate neighborhood have fruited with exceeding irregularity. A correspondent from Evansville, who cleared 200 acres of forest land along the Ohio of all growth other than pecan, reports that the yields have been disappointing. F. W. McReynolds of Washington, D. C. has 50 or more grafted trees now 8 or 10 years old, 10 miles north of the District, which, although in otherwise thrifty condition, have not fruited.

T. P. Littlepage of Washington, D. C., has some 30 acres of pecan trees, also grafted, on his farm near Bowie, Md., which have borne

some nuts during the last three years, but the product has been undersized, poorly-filled and distinctly inferior. Mr. Littlepage reports that during the past spring, these trees suffered appreciable injury in the freezing back of the fruit spurs and that the nuts which formed were from a second set of spurs. His trees bore in the neighborhood of a bushel of nuts which looked more promising than usual until the middle of October when freezing temperature occurring between the 14th and the 24th, completely destroyed the crop. At Bell Station, near Glenndale, Md., about three miles nearer Washington than Bowie, at Marietta, a colonial plantation, there is a clump of pecan trees dating back to the days of Thomas Jefferson. These are apparently hardy except in the matter of yields. Dr. M. B. Waite, of the Bureau of Plant Industry, who has long known these trees, states that they bore heavily in one year, about 1912, but that since that time, they have borne very little.

On the other hand, Mr. Albert Stabler of Washington, has 6 or 8 trees of varieties similar to those in the plantings of Messrs. Littlepage and McReynolds and of about the same age, on a farm not far from that of the latter, one variety of which, Major, in 1923 bore some very fair quality nuts. Although small, they were typical for that variety both in respect to size and high quality. The crop of 1924 was practically a failure, the set being very light. In the test orchard of Mr. J. F. Jones of Lancaster, Pa., young trees of several of the better known varieties are making a good start in the way of beginning to yield and in showing no appreciable signs of winter injury. Most of these trees bore light crops last year, (1923) but are practically barren this year.

South of Waynesboro, Pa., on a farm belonging to Mr. G. H. Lesher, there are 7 seedling pecan trees some 50 years old, which not only show no signs of winter injury outwardly visible, but have the reputation of bearing fairly well on alternate years. The present (1924) being the favorable year, the trees had a good sprinkling of nuts in clusters of as many as 5 each, when seen on July 23. A few miles farther north, in the town of Mont Alto, at an altitude of about 1000 feet, near the location of the State Forestry School of Pennsylvania, another tree said to be 65 years old, and having a girth at breast height of 65 inches, on the residence grounds of Mr. H. B. Verdeer, is apparently as hardy as are the indigenous species of the neighborhood. It is claimed to have recently borne three pecks of nuts

in a single season, and it now has a very good crop. Numerous other instances of pecan trees in the North might be cited, but these suffice to establish not only the uncertainty of hardiness of the pecan in the North, but also the probability of nut crops in occasional years or oftener, well beyond the generally accepted range of the species.

The hardiness of the Persian walnut is difficult to define. To again quote Dr. Waite, "*Juglans regia,* as we know it in the east and north, frequently succeeds over long intervals of time under conditions of climate, soil, elevation, and general environment suitable for the peach. It is perhaps a trifle more subject to injury by radical drops in temperature, but it recuperates with decidedly greater difficulty." Dr. Waite points out that there is a striking similarity between the requirements of local environment of the Persian walnut and the sweet cherry. It develops that this is a familiar comparison in southwestern British Columbia. Both require good drainage of air and soil, or the benefit of moderating influence such as is afforded by large bodies of water. Also both are endangered by warm spells during the dormant months.

These statements cover the situation quite correctly, as it is seen by the writer, although it might be added that beyond or west of the Ohio River, in the middle portion of the country, this species is seldom able to survive for more than one or two winters. Many trees have been planted in Michigan, but the great majority have passed out entirely even where peaches normally succeed. However, it is the experience of a few growers in Sanilac County, bordering Lake Huron, that within a half mile of the lake, there is a greater profit in Persian walnuts than in peaches. One grower at Lockport, New York, has found Persian walnuts to pay better than other orchard crops which he has raised at equal expense or upon equal areas of land. An orchard at East Avon, widely known at one time and visited by the Northern Nut Growers' Association in 1915, practically succumbed entirely after having borne but one good crop in about 35 years. Mr. F. A. Bartlett, of Stamford, Conn., who knows intimately many dozen trees of this species within a radius of 50 miles of New York City, finds that few bear significant crops except at long intervals. From Stamford, Conn., near the Atlantic Seaboard, south to Norfolk, Va., Persian walnut trees are not uncommon in door-yards. They are fairly frequent in southern Pennsylvania west over practically half the length of the State and through Maryland west to Hagerstown. There are perhaps more productive trees in Lancaster County, than in any other county in

either Pennsylvania or Maryland, with the possible exception of some county of the Eastern Shore of the latter state, which section already has been referred to. In Lancaster county yields are sufficient to give considerable profit from trees not occupying expensive land.

The Japanese walnut affords a curious anology in regard to hardiness. During normal years, it succeeds over practically the same range as that of the black walnut, yet it freezes in early fall, mild winter or late spring when conditions are adverse, even when black walnut and pecan nearby are not visibly affected. Mr. Jones finds the Lancaster heartnut, a variety originating in his county, to be subject to injury by spring freezing to such an extent that he has largely discontinued its propagation. Mr. Edwin A. Surprise, of Boston, reports that this variety grows well in summer but freezes back in winter about as much as it grows in summer. Mr. Bartlett regards it as one of the most valuable acquisitions in his nut planting at Stamford, Conn., as it is a handsome, vigorous grower, and promises to bear well. As a safer variety in the Lancaster district Mr. Jones has substituted the Faust from Bamberg, S. C., which vegetates later in spring and thus far has proved less subject to injury.

The twigs of young black walnut trees are occasionally injured by freezing in winter, but recorded instances of such damage are rare. This is a field which should be investigated, as there is evidently no data showing even the regularity with which the black walnut bears in any section, much less the extent to which fruiting is restricted by destruction of the buds or spurs as a result of severe temperatures in winter or spring. This also applies to hardiness of the butternut, the hickories and of introduced species of chestnut.

In conclusion, it is pointed out that planters should not assume that the presence of a healthy tree is proof of sufficient hardiness to warrant extensive plantings, neither should they over-look the fact that an occasional satisfactory crop may be but slim evidence of commercial possibilities. It requires years of trial before a species or variety can fully establish its hardiness. Yet, on the other hand, to wait to find a kind of nut a hundred per cent hardy under all conditions, would be not to plant at all. No varieties of any species are immune to winter injury over any great portion of the United States. The planting of nut trees in the northern part of the country is certain to go forward, but for the present, east of the Rockies, large orchards of nut trees of any species or variety must be regarded as fields promising for ex-

perimentation rather than of sound commercial investment.

A common error in the minds of the American people is the assumption that to be a success, a thing must be performed upon a large scale. To develop a nut industry, it is imagined that there must be great orchards of hundreds of acres. It is not realized that a great proportion of the walnuts, almonds, filberts, and chestnuts annually imported from Europe, are from roadside, hillside and door-yard trees which could as well have been grown in this country on what is now idle land in thickly populated agricultural districts. No one need expect to atttain great wealth from the products of door-yard or waste land trees but the by-product which could readily be salvaged from nut trees, would likely be very acceptable when interest and taxes or other bills come due.

WALNUT GRAFTING INVESTIGATIONS

T. J. Talbert, Professor of Horticulture, University of Missouri, College of Agriculture

These investigations are to determine the best varieties of the improved black walnut for Missouri. Valuable information is also being procured in reference to the topworking or cleft grafting of the native seedling black walnut to the improved sorts.

Since practically every Missouri farm contains some waste land upon which the native walnut and other nut trees may be growing, it is believed that it is possible to topwork these seedling sorts to improved kinds which will not only supply a larger quantity of thinner shelled, more highly flavored nuts for home use, but a surplus for the market. There is a growing demand for the seedling black walnut.

At the present time Missouri leads all other states in the production of this nut. The results which are being obtained in this experiment are proving to be of unusual interest and profit to Missouri growers.

The investigation has been extended to include, besides black walnuts, pecans, hickories, hazel nuts, chinkapins and chestnuts. With each of these nuts our object is to determine better varieties for Missouri conditions, more profitable and economical methods of production and more satisfactory methods of culture, as well as to stimulate an interest in the marketing and larger use of these products.

The improved varieties of seedling black walnut have been found to be exceedingly easy to propagate by cleft grafting the native or

common seedlings. The cleft graft has been used successfully upon seedling trees ranging in diameter from 1½ inches to as much as 8 or 10 inches. In general, however, it has been found best to cleft graft branches or limbs of no greater diameter than from 4 to 6 inches. Such wounds, if properly handled, usually heal over completely within 3 or 4 years. When larger branches are used, decay is much more apt to develop in the wound before healing over is accomplished.

The cleft grafting work is accomplished in the usual way. The limb or branch is removed by sawing it off. The end of the branch is then split with a regular grafting implement used for this purpose; or the work may be accomplished with an axe. If the branch is large, a wedge is driven in the center to hold the split cavity apart and to relieve the pressure upon the scions which are to be inserted. Wood of the last season's growth is procured from the variety which it is desired to propagate and the lower end of the scion, which is made about 4 inches long, is whittled to a wedge shape, after which it is inserted in the slit made upon the stock. Where the stock is more than 2 inches in diameter, it is usually advisable to place 2 scions; and where the stock is as large as 4 to 6 inches or more in diameter 4 scions should generally be used. After the placing of the scions all the cut surfaces should be carefully covered with grafting wax. Paper sacks are often used in our experimental work to cover the grafts and cut surfaces for a week or 10 days. It has been found that the inclosing of the grafted branches in paper sacks for this period lessens greatly the evaporation, and more of the inserted scions are apt to grow.

The scions may grow very rapidly, in which case it is usually necessary to brace them by tying a stick or branch to the stock and allowing it to extend for 2 or 3 feet above the point at which the grafting work was done. The inserted scions are then tied to this support. It is very important that the grower examine grafts after wind storms in order to repair damage which may have been done.

Investigations at this station have shown that grafts usually bear fruit in 4 years after the grafting operation. We receive some fruit, occasionally, in 3 years after the work is performed. It is also interesting to note that when seedling walnuts of the same size are selected, some topworked and others untreated, the grafted trees after 5 years' growth generally grow tops equally as large as the tops of the ungrafted trees.

The principal improved varieties of black walnut which are being used at this Station are as follows: Stabler, Ohio, Thomas and Ten Eyck.

(Note by the editor.—The cleft graft described by Prof. Talbert has been superseded in the East by other methods, chiefly the bark and the modified cleft grafts).

CARE AND PREPARATION OF NUTS FOR SEED PURPOSES

By Prof. E. R. Lake, U. S. Department of Agriculture

A nut is a seed, and a seed, normally, is an embryo plant asleep. To keep a nut-seed asleep and safely resting against the favorable time when it may awake, arise and go forth, as a vigorous seedling bent upon a career of earth conquest, requires no great or unusual attention and care save that which is necessary to maintain such conditions as will insure the complete maturing, ripening and curing of the seed, its protection against the ravages of rodents or other nut-eating animals, undue moisture and an unfavorably high temperature. In other words harvest the nuts as soon after they are mature as is possible, insure their complete curing, store them where they will be kept constantly so cool that germination cannot take place, (and some nuts, as the black walnut and butternut, may germinate at a temperature just above zero (centigrade(?) Ed.) and keep them moist enough to prevent undue hardening of the tissues or enclosing structures (shell), at the same time prevent them from becoming saturated with moisture and thus rotting. Summarized, these conditions are: (a) a temperature just too low for vegetative activity. (b) A moisture content of the nut just below turgidity. (c) An immunity against ants, rats, mice and squirrels.

Curing. A man-devised method for hastening the ripening of a matured seed or fruit, is usually carried on in a more or less enclosed space where the moisture and temperature conditions are kept carefully regulated, or in a place where the seeds are kept away from direct contact with sunlight and the earth. Ordinarily, the nuts are placed in trays 2″ to 3″ deep, 2′ to 2½′ wide and 5′ to 6′ long. The bottom tray is then placed upon a pair of sawhorses or other device, in a shady place and 2′ to 2½′ above the ground; then the other trays are placed on and above the first one until all the nuts are in the tier of trays, or until it is 2′ to 3′ tall. Sometimes a current of heated,

circulating air is used to doubly hasten the curing process, but this practice is to be discouraged as too often the undue heating of the nut germ while in this stage of ripening injures it, and thus the nuts are rendered unfit for reproduction. The nuts in the trays should be frequently stirred or turned over during the first week or ten days while curing.

In the case of chestnuts, the crop should be harvested as soon as possible after the first nuts fall so that the damage from weevils may be kept at a minimum. Immediately after the nuts are surface-dried they should be treated to an application of carbon disulphide, one ounce to a tightly closed capacity content of an apple barrel; time of treatment about 24 hours. While this treatment probably will not kill all the weevils it will insure a much larger percentage of germination than there would be otherwise.

After fumigating the nuts should be spread out on wire-cloth bottom trays and placed under a shed or trees, where a free circulation of air will in a few days sufficiently cure the nuts, so that they may be stratified and set away in a pit in the ground on the north side of a building, wall, hedge-row or evergreen trees, thus insuring them ample moisture and protection against sudden changes of temperatures and the ravages of rodents and other pests.

Other nuts of the temperate zone may, in a general way, be treated without any special care other than that required to keep them from getting moist and warm, or destroyed by rodents or other nut-eating animals, or by fungous troubles.

On the whole probably the best method of treatment for the amateur or small grower of seedling nut trees, is to stratify the nuts as soon as harvested, assuming that the nuts have been fairly well cured by a few days' exposure to drying air currents.

Stratification consists in layering the nuts in clean, sharp sand, light loam or sawdust and placing them in a cold, moist place, as a well drained and shaded north hillside, where their contact with the soil and protection from the direct rays of the sun will insure complete dormancy and at the same time prevent the development of fungous troubles. To this end the common practice is to dig a somewhat shallow trench and place in it, one layer deep, the "flats" in which the nuts are stratified. The flat usually employed is a shallow, wooden box in which the bottom is provided with ample, narrow drainage cracks and the top covered with wire cloth that will keep out mice or

larger rodents. Not infrequently the bottom is a wire cloth one instead of wood. Dimensions of the flats vary, somewhat, but a convenient size is 30″ long, 15″-16″ wide, 3″-4″ deep, sides ends and bottom being made of lumber strips (creosoted for preservation purposes) $\frac{3}{4}$″ thick and 3″-4″ wide.

In these flats the nuts are placed layer upon layer, with sand, loam or sawdust between, something as follows: one inch of sand or other medium on the bottom, then a single layer of nuts, another inch layer of sand, etc., until the flat is full, when it is covered with the wire cloth, placed in the trench, covered with a few inches to a foot of leaves, moist hay, cornstalks or even soil, and left for the winter. At the time the medium for layering the nuts is being prepared, it will be well, if ants are present in the section where the nuts are to be stored, or later placed in nursery bed, to mix a liberal percentage of unleached wood ashes with the sand, sawdust or loam, say one part in five, more or less.

Other flats are placed alongside or end to end in the trench until the stock is all in, when the whole may be covered uniformly. The layer of leaves or hay next to the wire cover of the flats assists in the work of uncovering when the inspections are made for the purpose of ascertaining the state of dormancy or germination.

One step more and the seed stage passes into the province of the seedling. As soon as the stratified nuts begin to germinate they should be removed from the flats and planted in the nursery or propagating bed. The site for this purpose should be one that is well drained, open to air and sunshine and possessing a clean, fine, mellow and rather light loamy soil. The size of this plat will vary to meet the needs of the quantity of nuts in hand and should be prepared, preferably the fall before, by stirring the soil deeply and thoroughly working into it a goodly supply of well rotted stable compost.

The rows for hand culture may be 18″-30″ apart; for loose hoeing, 3′ to $3\frac{1}{2}$′ and should lie along north and south lines. The distance and depth of the nuts in the row will vary with their size. In general, one may say that a nut should be planted the length of the lateral diameter below the surface of the soil, when it has settled, or about double that depth when the soil is freshly worked over it. The distance apart in the row will vary somewhat with the rapidity of growth of the species; six to eight inches being a fair average for walnuts and chestnuts, and 4 to 6 for hickories and pecans.

Species	Variety	Exhibitor	Address	Origin
1. Black walnut		J. A. Neilson	Vineland, Ont.	St. Thomas, Ont.
2. Black walnut		" " "	" "	Niagara-on-Lake.
3. Black walnut	Walsh	" " "	" "	Simcoe, Ont.
4. Black walnut		" " "	" "	Electric, Ont.
5. Black walnut		" " "	" "	Villoria, Ont.
6. Black walnut	Ohio	J. F. Jones	Lancaster, Pa.	
7. Black walnut	Stabler	" " "	" "	
8. Black walnut	Thomas	" " "	" "	
9. Persian walnut		J. A. Neilson	Vineland, Ont.	Carpathian Mts.
10. Persian walnut		" " "	" "	Grimsley, Ont.
11. Persian walnut		" " "	" "	St. Catherines, Ont.
12. Persian walnut	Alpine	J. F. Jones	Lancaster, Pa.	
13. Persian walnut	Mayette seedling	" " "	" "	
14. Persian walnut	Sinclair	" " "	" "	
15. Persian walnut	Wiltz Mayette	" " "	" "	
16. Heartnut		J. A. Neilson	Vineland, Ont.	Near Jordon, Ont.
17. Heartnut		" " "	" "	Near Hamilton, Ont.
18. Heartnut		" " "	" "	Near Scotland, Ont.
19. Heartnut	Faust	J. F. Jones	Lancaster, Pa.	
20. Heartnut	Lancaster	" " "	" "	
21. Heartnut	Ritchey	" " "	" "	
22. Sieboldiana walnut		J. A. Neilson	Vineland, Ont.	Hamilton, Ont.
23. Sieboldiana walnut		" " "	" "	OAC Campus, Guelph.
24. Shagbark		J. A. Neilson	Vineland, Ont.	Electric, Ont.
25. Shagbark		" " "	" "	Norfolk Co., Ont.
26. Shagbark hybrid	Beaver	J. F. Jones	Lancaster, Pa.	
27. Shagbark hybrid	Siers	" " "	" "	
28. Pecan		J. A. Neilson	Vineland, Ont.	15 miles N. of Toronto
29. Almond		" " "	" "	Gellatly, B. C.
30. Filbert	Tray of mixed	" " "	" "	Gellatly, B. C.

31. Filbert	White aveline	J. F. Jones	Lancaster, Pa.	
32. Filbert	Barcelona	" " "	"	"
33. Filbert	Cosford	" " "	"	"
34. Filbert	Daviana	" " "	"	"
35. Filbert	Du Chilly	" " "	"	"
36. Filbert	Giant de Halle	" " "	"	"
37. Filbert	Italian Red	" " "	"	"
38. Filbert	Merribrooke	" " "	"	"
39. Filbert	Noci Lunghe	" " "	"	"
40. Filbert	Rush	" " "	"	"
42. Filbert hybrid	Rush x Barcelona	" " "	"	"
43. Filbert hybrid	Rush x Barcelona	" " "	"	"
44. Filbert hybrid	Rush x Barcelona	" " "	"	"
45. Filbert hybrid	Rush Cosford	" " "	"	"
46. Filbert hybrid	Rush Cosford	" " "	"	"
47. Filbert hybrid	Rush Giant de Halle	" " "	"	"
48. Filbert hybrid	Rush Giant de Halle	" " "	"	"
49. Filbert hlbrid	Rush Giant de Halle	" " "	"	"
50. Filbert hybrid	Rush Italian Red	" " "	"	"

51. Photograph—Walnut-cracking machine Black Walnut Company, 509-11-13, Spruce St., St. Louis, Mo.
52. Budding Knife

Among those present at the Fifteenth Annual Convention of the Northern Nut Growers' Association, were the following:

Dr. N. L. Britton Director of the N. Y. Botanical Gardens.
Dr. Fred E. Brooks, Entomologist, U. S. Dept. of Agriculture.
Dr. and Mrs. Frank L. Baum, Boyertown, Pa.
Mr. Willard G. Bixby, Baldwin, N. Y.
Dr. A. F. Blakeslee, Cold Spring Harbor, L. I.
Mr. and Mrs. F. A. Bartlett, Stamford, Conn.
Miss H. T. Bennett, Boston, Mass.
Prof. J. Franklin Collins, Providence, R. I.
Dr. John E. Cannaday, Charleston, W. Va.
Mr. G. M. Codding, Mt. Vernon, N. Y.
Prof. A. S. Colby, University of Illinois, Urbana, Ill.
Dr. W. C. Deming, Hartford, Conn.
Mr. Zenas H. Ellis, Fair Haven, Vt.
Mrs. W. D. Ellwanger, Rochester, N. Y.
Mr. Ammon P. Fritz, 55 E. Franklin St., Ephrata, Pa.
Mr. A. F. Graf, Bardonia, N. Y.
Mrs. B. W. Gahn, U. S. Dept. of Agriculture.
Mr. and Mrs. Karl W. Greene, Washington, D. C.
Dr. M. A. Howe, Assistant to Director, N. Y. Botanical Gardens.
Mr. Henry Hicks, Baldwin, L. I. (Hicks' Nurseries).
Mr. John W. Hershey, E. Downington, Pa.
Mr. Lee Whitaker Jaques, 74 Waverly St., Jersey City, N. J.
Mr. J. F. Jones, Lancaster, Pa.
Mr. M. G. Kains, Suffern, N. Y.
Mr. Thomas W. Little, Cos Cob, Conn.
Dr. Robt. T. Morris, Cos Cob, Route 28, Box 95, Stamford, Conn.
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(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

SIXTEENTH ANNUAL MEETING

ST. LOUIS, MO.

SEPTEMBER 22, 23, 24, 1925

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

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Northern N. Y. Development Co., 32 Nassau St., New York City
Olcott, Ralph T. (Editor American Nut Journal), Ellwanger and Barry Building, Rochester
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CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay three dollars annually, or four dollars and a half including a year's subscription to the American Nut Journal. Contributing members shall pay ten dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Article V

Members shall be sent a notification of annual dues at the time they are due, and if not paid within two months, they shall be sent a *second notice,* telling them that they are not in good standing on account of non-payment of dues, and are not entitled to receive the annual report.

At the end of thirty days from the sending of the second notice, *a third notice* shall be sent notifying such members that unless dues are paid within ten days from receipt of this notice, their names will be dropped from the rolls for non-payment of dues.

REPORT OF THE PROCEEDINGS

at the

SIXTEENTH ANNUAL CONVENTION

of the

NORTHERN NUT GROWERS' ASSOCIATION, INC.

September 22, 23, 24, 1925

Held in

ST. LOUIS, MISSOURI

Chairman—Pres. H. R. Weber

NUT GROWING AT FRUNUT GARDENS

By Judge W. O. Potter, Marion, Illinois

Before and since the dawn of civilization, the one constant battle of life with mankind has been for bread and meat. The struggle throughout the coming years of time, will be for bread and meat. Men have ever toiled and struggled through all past ages, wars have been declared and fought, peoples have been destroyed, nations desolated and mankind suffered untold hardships for bread and meat. "Man cannot thrive on bread alone" but with meat as a complement, the menu is balanced, which constitutes the Staff of Life.

DEC 5 - 1935

When drouths, pestilence and famine have destroyed nations, when corn and wheat have failed, when hogs and beef have become

scarce, so that bread and meat could not be obtained in the usual way, primitive man has then showed his superiority over his civilized brother by resorting to the store-house of nature for the Staff of Life. Nature has provided most lavishly for man in supplying him with food, and drink, but man has most ruthlessly despoiled the bountiful supply of nature in the destruction of forests.

Less than a century ago, the forests of the northern section of the United States were the most diversified in the world. The oak, hickory, chestnut and walnut, with their kindred species, indigenous to the forests of North America, were the wonders of the world. The timber obtained from these four giants of the forest has revolutionized modern civilization, but what other wonders might have been wrought, if man in his ruthless destruction of forests, had saved for posterity the choice specimens of these species, which produced the most toothsome and vitalizing concentrated food products of all ages. The acorn and chestnut have all the concentrated calories of bread; the hickory nut, pecan and black walnut have the most complete concentrated calories of meat, constituting both bread and meat in the most nutritious form, completing the Staff of Life.

In addition to the great bread and meat nuts above mentioned, there is yet another very important nut which grows on bushes in a wild state in North America known as the hazel, and in Europe as the filbert. How often in boyhood days have we gone out on nutting parties in the Fall to gather the hazel and hickory nut in the "Forest Primeval" in the most beautiful season of the year, little realizing that we were gathering the most nutritious food in the most concentrated form provided by nature's laboratory and mixed by nature's most skillful chemists. The meat of the filbert is not altogether of the consistency of breat nor meat, but partakes more of the properties of bread than meat.

I remember, when in boyhood days down on the farm, several fine specimen of hazels, hickories and walnuts from which I have gathered some of the most delectable nuts that ever graced the bill of fare of the most fastidious delicatessen. They were fit for the food of gods or the menu of potentates. I would give a great deal for some of these old nut patriarchs. But their value was then unknown and they were not preserved for posterity. However, we must make the best of what we have at hand.

About ten years ago, I became interested in the propagation and intensive cultivation of nuts. I first became interested in paper shell pecans in the South. I developed an orchard at Albany, Georgia, where I now have a fine orchard with a good crop of nuts this year. I, also, have a combination orchard at Silver Hill, Alabama, of paper shell pecans and Satsuma oranges, with a fair crop of each this year.

Pecans

In the year 1918, I purchased an old run-down farm of forty acres four miles west of Marion on State Highway Route 13, and named it Frunut Gardens as I determined to experiment here in all kinds of fruits and nuts—hence the name. I shall say nothing about the fruit, except to say that I have all kinds of fruits that are adaptable to this climate growing. I first set five acres in pecans in 1919 from a small nursery of my own in the Northern varieties of Butterick, Posey, Busseron, Green River, and a few of other varieties. The trees are now five years old and have made a fine growth. They have bloomed for the last two years but have set no nuts. I then planted fifteen acres to nuts where the permanent trees are to be and have been budding them since as they got large enough. I use the ring bud method and have some very fine specimens of these young budded trees. I also budded some McAlister Hicans, which is a cross between a hickory and a pecan. These trees are making a fine growth, but have set no nuts as yet.

When I first commenced at Frunut Gardens, I limed it with four tons per acre of lime dust and sowed it in sweet clover and let it grow for two years when it reached a height of eight feet. I then turned this all under. Since then I have been sowing it to cow peas and soy beans and turning them under until the soil is now in a high state of fertility. I have also spread barnyard manure around each tree for the last three years each winter. Last spring, I gave to each older tree twenty pounds of a mixed fertilizer in the following proportions:

1200 pounds of 16% Acid Phosphate.
250 pounds of Nitrate of Potash.
300 pounds of Tankage.

I have had considerable trouble with bud worms, limb girdlers and caterpillars. There is no relief so far as I know from the two former pests. For the latter, I spray with lime sulphur reinforced with

nicotine. This does the business. I spray twice each season, the first time about June the first, the last about August the first.

Hickories

I have two Weiker budded hickory trees on my lawn in town, but they grow so slowly that I have never tried to bud any hickories at the Gardens. However, I have about fifty native shagbark trees which were in woods when I purchased the farm and I cultivated and fertilized these trees to improve the nuts. I have some very good varieties from these seedlings, but none to compare with those I remember in boyhood days.

Filberts

Some years ago, I received a notice from the Weber Nursery Company of Nursery, Missouri, saying they had some imported filbert bushes from France which they would like to have tried out and would sell them for 25c each. I ordered six plants and set them in my back yard and paid very little attention to them. Finally I got interested and began to study the filbert and its growth and development and then began the propagation of them by layering, and from this beginning have set about four hundred plants at Frunut Gardens. The varieties I have are Dorrton, Blanc Lounge, Cosford and Effergut. The last is a very poor bearer, but a prolific bloomer. They are named in the order of importance in their bearing record. I planted bushes from Oregon and the German varieties from New York, but these have not met expectations. This year, five bushes in my back yard produced about a half bushel of nuts. The four year olds at the Gardens also produced quite a few nuts. The bushes have a spread of about twenty feet and have reached a height of twenty feet, and make fine bushy trees.

I have never had any trouble with insects or fungi on the filberts. However, they have winter killed rather severely, but for every limb that winter killed, two more grew in its place and some of the new limbs produced nuts this year. The bush tree presents a fine appearance and makes a fine foliage plant for shade and beauty. I have never sprayed them in any manner. I expect to fertilize the plants this winter with leaf mould which I have prepared for the purpose.

A few years ago I obtained some nuts from the Park Commissioner of Rochester, N. Y. that he said grew on a tree in the park, which

he claimed was a Constantinople Hazel. I stratified some of the nuts in sand, but it took two years to germinate and then only two germinated. These two bushes are now growing at Frunut Gardens. The nut is rather small with a thick shell. However, the flavor is very good, and by proper breeding, I think good results may be obtained.

Walnuts

Perhaps the most diversified timber and nut tree in the United States, or we might say in North America, is the black walnut. Every boy who was raised on the farm or ever spent a vacation in the country knows the black walnut. The tree is a majestic monarch of the forest, and its nuts are among the most nutritious of the meat varieties. The shame is that is has been so ruthlessly destroyed and so carelessly propagated.

I have planted and am budding about one hundred trees at Frunut Gardens to the Stabler and Thomas varieties. These are among the best varieties known. I have trees only five years old that have a half bushel of nuts this year. The only trouble I have had with walnuts are the caterpillars which will defoliate a tree in one night. I use the same spray for this that is used on the pecan for the same trouble.

I am experimenting some with the English Walnut but they winter kill so badly that I would not advise the propagation of this nut in this climate for commercial purposes. I have budded the Alpine on black walnut stock and they seem to be very hardy. They have produced no nuts yet. I also have a few Chinese and Japanese walnuts but only for experimental purposes, and do not know yet what the final results will be.

Chestnuts and Chinquapins

I have about a dozen budded chestnut trees growing which I purchased from Mr. E. A. Riehl a few years ago. They commenced to bear when about three years old. I have seen no sign of blight or any fungous trouble of any kind so far. The varieties are Boone, Progressive and Fuller.

The chinquapin is the outgrowth and development of forest chinquapin acorn that used to be so much sought after by boys and hogs in the Fall of the year. The budded variety is a cross of this old forest tree with the chestnut.

I planted some of the Rush chinquapin nuts a few years ago, and from this experiment I now have two trees on my lawn that are in bearing. One of these seedlings bears only one nut in the burr, while the other bears three nuts in the burr.

There is no special care to be given the chestnut and chinquapin. Just cultivate and fertilize the same as any other tree, but they grow about as well on the lawn, where no cultivation is to be had, as in the field.

To those who are planning to plant trees, I would say plant nut trees. Plant the pecan, chestnut and black walnut both for timber and nuts. Plant the filbert for nuts. If you want only foliage, plant all of them for foliage and shade. Plant the filbert on the lawn or in the field for its thick glossy foliage and nuts; plant the chestnut for its majestic appearance, foliage and nuts; plant the black walnut for its timber, wide spreading limbs and nuts; plant the towering pecan for its beautiful appearance, timber and nuts. Whatever you plant, let some of your plantings be of these four kinds.

When production warrants, modern ingenuity will perfect machinery to crack the nuts and grind the meat, either into meal for bread or meat for steak. The most perfect nutritious breads and meats will be the result when mankind realize the perfectly balanced foods that can be produced from the products of the trees—the engines of production.

Five or ten acres of nut trees properly distributed will supply the ordinary family with bread and meat. Beef steaks and pork chops are getting scarce and costly and will continue as time passes. One pound of pecan or walnut meat is worth in nutriment about three pounds of beef steak.

Lincoln once remarked, after a frugal meal of milk and mush, that it was good enough for a president. When a citizen of America can sit down to a meal consisting of a dozen pecans or walnuts broken into bits with a mixture of sterilized bran, properly seasoned with salt and cream, followed with a dessert of Satsuma oranges or Golden Delicious apples, he will be the envy of the potentates of the earth or the gods of Olympus.

ROADSIDE PLANTING

By Wm. S. Linton, Saginaw, Mich.

Do you realize that in the United States there are 2,800,000 miles of highways,—that these highways are equal to 22,400,000 acres of land, an area as great as six states of the Union combined, or making all of New England, if you please, a desert, so far as unproductiveness is concerned, producing no more for life on this Globe than the Desert of Sahara or the Arctic regions? But such is the case, and it is this condition that we desire to remedy and correct.

The majority of those present at this important gathering know that for years, and especially since I have been honored with membership in this association, that it has been my "hobby," incessantly talked, to advocate that *along with road building should go road planting* Always To Be Useful and Food Producing, as well as ornamental in character. Nothing, therefore, has afforded me greater satisfaction than to witness today activity in many places absolutely along these lines, with Road Commission's and Forestry Department's displaying placards stating that,

Roadside Trees—*Will be a great source of rich and delicious food.*

Will increase the value of the adjoining land.
Will serve as windbreaks, modify extreme weather.
Will prevent erosion of soil or bank destruction.
Will beautify the highways and the landscape.
Will harbor birds, thus assisting agriculture.
Will protect roadbeds from the hot sun of summer.
Will make road traveling a much greater pleasure.

Consequently, I congratulate such communities, that are usually those in the advance rank of all progress, on having acted in this important matter, and suggest that every sovereign state in America should emulate the example, while counties, cities, villages, and townships, in detail should follow its lead.

The Northern Nut Growers Association has had much to do in the pioneer work of promoting and establishing movements to bring

about the production of improved varieties of valuable nuts, but in my opinion its duties will not be entirely completed until steps are also taken that will cause all our highways to become not only perfect for transportation, but the most alluring in appearance and character, and the *most productive,* too, of any in the world. How can such a gratifying result as this become an accomplished fact? Simply by close team work and active co-operation upon the part of federal, state, county and township officials, acting with local civic organizations where essential, during the next few years, in attending to the planning and planting, of every roadway in our country. For this purpose fine and beautiful trees and shrubs should be used, that are valuable in their products also, and which POSITIVELY supply in abundance, excellent food substance, to man, bird or beast.

It is a waste of valuable time, and valuable ground, to plant short lived soft maples, box elders, poplars, willows and other inferior trees, that unfortunately are found so frequently along roadsides, when in fact they should be removed like noxious weeds from a fine garden, in order that food producing trees, nut bearers, and others much longer lived, more beautiful in form and character, may take their place. We of Michigan are delighted that our State Agricultural College, the pioneer of its kind in the country, with its strong progressive management, forwarding many excellent economic measures, is now making a detailed study of the entire state relative to nut and other tree food production.

You may have read recently in the daily press where a grower paid $50,000 for an improved strawberry plant and, if the account of its claimed remarkable properties are true, it may be worth it, proving the immense value of rare varieties of all choice food plants. That greatly improved walnuts, butternuts, hickory nuts and beech nuts, can be propagated wherever they are indigenous or can be adapted to the soil and climate goes without saying. The beneficial results, of proper selection of seed or scion in nut culture, will be just as certain as was the development of the Delicious apple, Jonathan, or Northern Spy from common low grade kinds. They will be just as certain as was the development from inferior species, of the rich delicious pecans of the south, the propagation and sale of which, now nets many millions of dollars to the states bordering on the Gulf of Mexico. Here is where roadside planting will play its great part in the evolution of these giant trees, producing as they will, much choice valuable timber,

and that rich food in abundance said by Dr. Kellogg, head of the Battle Creek's big Sanitarium, to be the best, most wholesome and choicest food that humans can eat. Are not such results worth while? Right here, though, comes along the fellow, generally a pessimist, who says it is such a tremendous job in its immensity and detail that it cannot be done. I claim it is simple and comparatively easy. It was my good fortune, as president of the Northern Nut Growers Association to receive a few years ago from the Ladies Mount Vernon Association of Virginia, forty bushels (about 10,000 nuts) of large selected unshucked black walnuts from several fine trees planted by George Washington, or during his time, at his imposing home (now America's shrine) on the banks of the Potomac. After distributing about 9,000 of these nuts to schools and for other public planting in places where they are growing, one thousand were planted, nursery style in rows in a Saginaw park, and the latter alone produced almost a thousand trees for further distribution, the majority of them shoulder high today. What was done in this case with black walnuts can certainly be accomplished with other valuable species also, throughout the country by good official or civic team work and without great expense either, thus in time bringing returns in enjoyment and wholesome food for our future citizenship, the value of which cannot be estimated today in dollars and cents. Road plantings, for our territory, generally, should be confined almost exclusively to the best nut bearers, viz: the black walnut, the butternut, the hickory, the beech, the chestnut, and the sweet acorn varieties of the oak, using also the sugar maple with its valuable sugar sap and the basswood and locust for their honey producing qualities, and also any fruit trees that can be cared for in a practical way.

Occasionally and where soil requires it, plant for our bird friends the hackberries, mulberries, June berries and wild black cherries, all useful as well as beautiful. In very light or extremely low land, plant the pines and cedars or other evergreens; the products of all plantings to be distributed in a just and equitable manner to the adjacent land owner and to the public. The trees I have named planted in rows, colonies, or irregularly, will produce as fine a landscape effect as any that grow, and if an average of 40 ft. apart is maintained lengthway and crossway of the roads, it will require an immense number, yes, many millions of plants, scions or seed to complete the growth in its entirety, but when matured, its value will be

that great, it cannot even be estimated today. The seed plan of planting is by far the most economical, is generally satisfactory, and it leaves the tree with its tap root (undoubtedly an advantage of nature, where originally placed. The seed used, however, should be of the very largest and healthiest in character, and selected from the choicest of trees, taking strong vigor of growth and quality of product into consideration. Seed nuts should be selected for their *size* and *thinness* of shell, plumpness and *quality* of meat.

The efforts and results on forestry in the United States to date, commendable as they are, seem puny in comparison with figures showing the possibilities and scope of a complete road planting. Forestry as now advocated and practiced should and must go on, as it cares generally for what are almost worthless lands, and is confined to a limited species of woods. The great majority of our roadways, however, pass through the best of soil, adapted for strong luxuriant tree growth of all kinds, and should be utilized to the limit in man's economies. It is a stern duty we owe to those lives which are to follow ours to begin this great work now. It cannot be, or at any rate, never will be, performed in any great degree by individuals, firms or corporations that, under our present system, are heavily taxed for years upon such property. Hence they are forced selfishly to provide only for immediate returns or dividends during the short period of their own lives. Planting as outlined must, therefore, be accomplished almost wholly by nation, state or other municipal divisions. It was my honor last year to submit to assembled engineers at the University of Michigan, a paper similar to this, bearing upon the same subject and I quote liberally therefrom.

The warnings of Theodore Roosevelt, of Gifford Pinchot, Governor of the great Keystone State, Filbert Roth of the U. of M. and other leading conservationists are at last being heeded, their advice accepted, and mighty efforts, gaining momentum and headway every day, are now being put forth in almost every state in the Union, to renew the magnificent forest growth that was our heritage. Fortunately now a grand new avenue, the construction of improved roads on fertile soil and with immense area has arisen, that affords a wonderful opportunity to replace or even add to their original numbers, all of our finest trees and useful and beautiful shrubs by extensive roadside planting. This can positively be done on every mile of that magnificent highway system being established and constructed nation-wide, from Canada

to the Gulf, and from ocean to ocean, in such length, number and immensity, that the famous roads of Caesar are but modest lanes in comparison.

While this roadbuilding in its entirety, (the greatest constructive effort in the world's history) is in progress, we should not lose the opportunity now ours to plant along these great highways useful trees and shrubs in all their beauty and attractiveness, not only for the pleasure, comfort and happiness of our own generation, but when fully matured, giving an added and very substantial production of many choice foods for the generations yet to come. At the same time the plan will afford much needed protection to that valuable bird life, so very necessary to our own existence.

It would be the height of folly, a sin, and almost a crime to occupy this varied, vast and valuable public domain of roadways or any part of it with other than plantings of *the most useful character.* Every inferior or useless tree and shrub should be avoided, and, in time, absolutely eliminated. Why waste the time of labor in caring for them, or any area of soil for their maintenance, when every square rod of arable land should be producing something to sustain or promote the welfare and life of living beings.

Reforestation is one of the greatest projects of the day and worthy in every way of the earnest thought and efforts being given to it by leading men of our time. From the fact, however, that millions of acres have been laid waste by the axmen seeking timber supply alone, and then later (owing largely to infertility) great areas have been abandoned to drouth and devastating fires, a deplorable situation consequently has arisen. This naturally confines reforestation efforts largely to the areas cited, and also to certain species of timber, somewhat limited in number, that will grow thereon.

How different with the road area equal in extent, but much *more important in producing acreage,* than out over abandoned lands. We are given right now a real and rare opportunity throughout our country, with its varied climates, soils and altitudes, with the many species of mighty trees, and attractive shrubs, all indigenous to these conditions, to establish at once for our own time, and posterity as well, the most useful and magnificent planting for the benefit of our race, that the world has ever seen.

I have not from my own personal viewpoint and information, in this paper, or at any time, undertaken to name in detail the entire species or varieties of useful trees and shrubs to be used in planting roadsides. I would rather leave that feature of detail to the authorities in charge, having, as I do, the utmost confidence in excellent State Highway Officials' desire and ability, in co-operation with proper State Departments, to satisfactorily perform this work.

I am sure State Highway Departments will naturally use largely among trees *the nut bearers* and the others referred to. I am sure, too, Departments of Agriculture will take into consideration the great bird life of our nation not alone from a sentimental standpoint, or for the delight we take in viewing and listening to these feathered songsters, but for the most important reason of all, viz: that they kill in countless numbers insects intolerable to us, and devour great quantities of seeds of noxious weeds. The abnormal increase of either of these pests would be most calamitous, and could absolutely destroy much of life as we know it today.

The subject of useful roadside planting covers the movement too, that is establishing beautiful *Roads of Remembrance,* by the planting of monumental trees (an enobling idea) throughout our land.

No other monument can be more fitting to those who have fought our country's battles or achieved fame in heroic efforts for bettering humanity, than these Roads of Remembrance being constructed in every state, instilling as they do and will, true patriotism in the minds of all, young and old alike.

The house upon any properly planted roadway, will be a happier home, a more pleasant abiding place, and a much more valuable piece of property than one upon a bare, unplanted road.

The University of Michigan's part in scientific road construction plans, in state and Nation, has been invaluable. Neither has any other institution in America taken a more prominent part in the problem of reforestation of our country's 100 million acres almost abandoned, that have been so severely cut for timber alone and later burned over that they have become an unproductive waste, equal in area to the combined forests of eight European Nations. Now as we meet the question of "Useful Roadside Planting" to reforest a mighty area, I wish to give credit also to a U. of M. man, a member of this Associa-

tion,—Senator Harvey A. Penney, Chairman of the University Legislative Committee in the Michigan State Senate, for introducing the first real bill enacted into law in this country, for practical road planting work. This act is now being persistently called for, copied and used throughout the United States. In the years—yes centuries to come, majestic trees and beautiful shrubs, every one of them of much worth to the human race will bear witness to the inestimable value of the initial work of organizations such as this.

THE ENVIRONMENTAL REQUIREMENTS OF NUT TREES

Dr. Geo. D. Moore, Director, Missouri Botanic Gardens, St. Louis, Mo.

The environmental requirements include the air and soil, everything that goes on in the soil and air. Of course we all recognize that nuts are very susceptible to their environment. Perhaps this may be illustrated by an instance which occurred not very far from here, a case of a tramp coming to a farm house and asking for something to eat. The housewife said, "I will give you your dinner if you will work for it." He said, "I don't work." She asked, "What do you do?" The tramp said, "I am a vaudeville entertainer and I entertain." "All right," she replied. So he began telling some of his jokes. While he was talking they heard a big noise on the table. He finished his performance and got his dinner and left. The housewife on going to the table, found that nearly all the nuts that had been in the basket had split their sides laughing at those jokes. The next day she was surprised to again hear a noise in the nut basket. Being astonished to hear it again when there was no apparent reason for it, she went to the basket and found that this time it was the *English* walnuts. This story illustrates how easily the nuts are influenced by their environments.

We have been growing a few nut trees at the Missouri Botanical Gardens and we have come to the conclusion that the environmental air of the city is not good for them. We have had only fair success,

from a commercial standpoint. Some of the trees have borne and some have not. We have come to the definite conclusion that in order to succeed with nuts, it is necessary to go to the country. You may not be aware of it but the atmosphere of St. Louis is about as bad as any of the other cities in this country. Perhaps it will improve. This smoky atmosphere is not a good thing for nut trees. It often blights the blossom. Many trees and shrubs that formerly bloomed do so no longer. Consequently we have gone thirty miles out of the city and acquired some ground on the Merrimac River where we are going to grow nuts. We have four or five kinds of soil, and every exposure and when you come back to St. Louis again for your meeting, I hope to be able to show you a very vigorous and well established nut orchard of a size to make it interesting.

I cannot go into the real environmental problems from the standpoint of the soil at this time. Most of us have the idea that soil is a sort of a sponge through which water flows. We pour in fertility having no relation to the various environmental factors of the natural soil. The question of tillage or cover crops I had hoped to touch upon because I wanted to ask some questions myself about that. There seems to be a good deal of difference of opinion as to cultural practices. Grass seems to be distinctly harmful. You will however have to plow under some sort of humus crop before you go back to clean cultivation.

THE FARTHEST NORTH IN U. S. NUT CULTURE

By Z. H. Ellis, Fair Haven, Vermont

It seems a far cry from a small town in faraway Vermont to this the Metropolis of the Middle-West, with twice the population of my whole state. Nearly a century ago two uncles of mine left their native town, mine as well, for the then wild, uncultivated prairies of Illinois, only a few miles from here. One of them of a speculative turn of mind, gathered up the peltry of his region and traded it in at this, then a frontier post. Later on he traded mules and horses at New

Orleans for sugar and molasses and boated them up to this point to supply his neighbors with sweetening, as they sorely missed the maple kindred product of old New England, whence the most of them came.

Nearly three score year ago I visited these uncles of mine in Greene County, Illinois, and the objects that most took my childish fancy were the black walnuts on the one farm and the hazel nuts on the other. When time to return home came, my treasures to take with me were specimens of both; but my father said the damp, clammy things should not go into the trunk. However, when we reached home my mother took them from the bottom of the trunk where she had placed them, unknown to us both, and ordered my father to help me plant them, as my seven-year-old hands were not strong enough to break the frozen ground with a heavy crowbar.

All the black walnuts grew but one, and are now immense trees of saw-log size, bearing bounteous crops for many years, the parents of all the black walnuts in the region. I liked the nuts so well that, when a half century later, I heard of improved varieties, I procured some seedling trees. These, as seedling trees usually are, were no better than mine. The grafted trees which next came out retained the improved cracking qualities and flavor of the original. I consider them the equal in every way of their English brother. When an apple tree dies, I usually replace it with a Thomas black walnut, the best for my locality. They should be planted on every house lot and farm, along with the improved hazels.

The common hazels were small and retained their husks and, after trying their filbert brothers from every land, I found two of this family to my liking, one from the Middle Northwest, which drops readily from its envelope and the other from Biltmore, North Carolina, of immense size but not so readily separating from its husk. I have over a hundred of the genus Corylus. They bear very young and stand well the frosts of late spring and cold winters. To give you an idea of their precocity, would say that a German variety set out this season now has six nuts on it. The Kentish Cob does the best with me of the foreign kinds and falls early and readily to the ground. They are long and beautiful nuts. I find it a good plan to bend the pliant branches of all the foreign varieties to the ground in the fall and weigh them down with heavy flat stones. The deep snow covers them up and the male catkins are saved for furnishing pollen in the

spring. They all require very little fertilizer and are a beautiful sight when literally loaded with fruit. They make the best possible hedges for dividing town lots, instead of non-producing bushes.

I have Japanese walnuts, immense trees; but I like our good old-fashioned butternut far better. One occupies the post of honor in front of my home. In olden times this kind of tree furnished for the early settlers, physic, dye, cabinet wood, dessert fruit, sweetening and fuel. I find it responds well to good treatment, the better fertilized, the larger the nut and the better the flavor.

After seeing the almond on the plains of Palestine and Spain, and the English walnut on the hills of Italy and Southern France, I wanted to try them. I have set out a few of the hard shell variety of the former and many dozens of the latter. I have had the one blooming and the other setting its fruit. If I live long enough I will make both a success, or die in the attempt.

I have set out many pecans; most died the first winter or so, or remained tiny, puny plants. One that I procured from this state is the only one to amount to anything. It has grown like the green bay tree, much over thirty feet in height and nearly a foot in diameter. It is the only one in the state. It blossoms, but has not borne as yet. Even so, it is worth the interest on a one-thousand dollar U. S. bond, for something unusual to show my friends and visitors, of which the latter I have legions, and furnish clean conversational material when the weather, politics, etc., give out. I have hybrids of this tree, with its hickory brother, which I think will be a success in fruiting for me.

The hickory is indigenous in Vermont, hardy, and bearing good nuts. Strange as it may seem, the improved varieties present the hardest problem with me, as they grow slowly and are prone to die. I have none in fruiting yet. The Laney and Fairbanks succeed the best so far, and I anticipate their early fruiting.

I find two great requirements in starting all kinds of nut trees; first, shade them well the first year, and second, keep fertilizers during that period entirely from them, except perhaps a little leaf mould. I have had no disease to trouble them except the chestnut blight and that I am keeping down and expect soon to have entirely obliterated, as I am outside of the regular chestnut region. My Chinquapins are entirely untouched by it.

Nut trees make the best ornament for the lawn, just enough shade for comfort, without killing out the grass, flowers, etc., around them. There is nothing monotonous about them. Each sort has a different bloom or mode of fructification. You say they have no conspicuous flowers. The hardy almond blooms well with me and rivals the peach in size and coloring of its flowers. The fruits of the others, especially the hazels and filberts, give pleasure to the eye and are far more enduring than any ephemeral bloom. Above all, in this utilitarian age, when the food problem is so acute, they should be cultivated for that purpose. It is the easiest and cheapest way of producing protein for building up and sustaining the human body for efficient work.

When this country can raise enough for home consumption, millions of dollars will be thus saved, not only for public purposes, especially good roads at all seasons of the year, but better yet, the raiser thereof can so embellish and equip his home and surroundings as to keep the country people from swarming into the cities as at present. In fact, the city dweller will be eager to move into the country Utopia, so attractive and profitable will nut growing make it.

You that are living in this comparatively warm region can easily raise all the nuts of the warm temperate zones, and are not obliged, like me, to search the world over for hardier specimens and more rugged hybrids. Necessity is the mother of invention, and I utilize every warm location around by buildings for the more tender varieties: and I am establishing a thick wind-break of evergreen trees, which I am in hopes will move my latitudinal line two to three hundred miles further south.

As I am now situated I have six genera, twelve species, and thirty-five varieties of nut producers.

I would say in closing that I recently read in an insurance pamphlet that statistics showed that the best risks for indemnity companies were persons who were fat, swore some and had a hobby. That is, they were the least likely to go wrong and thus cause loss to those that guaranteed their honesty. The moral is: Grow nuts; eating them will make one healthy and put on avoirdupois, in cracking them, one will occasionally hit his finger, causing stronger language than usual, and, as for a hobby, I have found it the best and pleasantest possible.

NUT GROWING IN MISSOURI

By Prof. T. J. Talbert, Dept. of Horticulture, Univ. of Mo.

Few realize the opportunities for the culture of the native nuts of Missouri for home consumption and the commercial markets. Neither is it generally known that Missouri ranks first in the production of black walnuts and black walnut lumber. Missouri also takes high rank in the production of the pecan, the most universally grown nut tree in America, the principal groves being located along the Mississippi and Missouri rivers. But few, if any states, all factors considered, are better adapted to the production of these nuts. We have been too much interested in producing fruits, grain crops and mules to give this wholesome and nutritious food the consideration which it demands. Worst of all we have ruthlessly destroyed in many instances the beautiful, productive and valuable nut groves throughout the state.

Someone has said that the groves were God's first temples. This statement must have referred to the Missouri walnut, hickory, pecan, and chinquapin groves, because there are none greater or finer to be found anywhere. The shell and shag bark hickory nuts, white walnut (butternut), hazel nuts and chinkapins, are native and common to many sections of the state. These nuts are hardy and productive under Missouri conditions. Their flavor and quality is unsurpassed. Missouri can boast of as great or a greater range in native nut production than any other state. The nuts mentioned may also be grown successfully and profitably in all of the 114 counties of the state.

Value of Nut Trees on the Farm

Nut trees on the farm are valuable for not only their fruit and lumber but they provide shade and protection for live stock, crops, and the farmstead. They are also objects of beauty, and enhance the appearance of the landscape. They may be grown profitably and successfully on lands which are not suitable on account of roughness, odd shape, steepness, gullying, or being an out of the way place. The trees are also generally easy to procure and start. Their culture is

not difficult, and few insects and diseases in Missouri attack nut trees seriously.

As individual trees, therefore, black and white walnuts, hickories, and pecans, may be grown profitably for their nuts, or they may be grown in groups on good land which is not valuable for other purposes, particularly for the growing of truck, fruit, or grain crops. Missouri is favored in that her native nut trees may be generally grown successfully where grain crops thrive. Our farmers are, therefore, very fortunate because of this fact as practically every owner of land can find some place on his farm suitable for the growing of nut trees.

Nut Trees for Road-Side Planting

The native walnuts, hickories, and pecans of Missouri lend themselves admirably to road-side planting. This is true because the trees are hardy, and fairly good growers. Little spraying is required for fruit production or the protection of the foliage. Their large size, stately and beautiful shapes are attractive and add materially to the beautification of road-sides. There is no other suitable tree for road-side planting that has as long a life or is as desirable from every viewpoint as our nut trees. Last but not least, the fruit of nut trees grown on the road-side is enjoyed and long remembered by all who use the highways.

Propagation of Nut Trees

Hickories and pecans are generally a great deal more difficult to propagate by budding and grafting than fruit trees. An inexperienced operator will, therefore, usually find great difficulty in propagating nut trees. Skilled propagators, however, are able to multiply them rapidly and successfully. Since the business of propagating nut trees requires skill and patience and a high degree of specialization, it is generally a wise procedure for the farmer to purchase the nut trees desired from some reputable nursery rather than to attempt to propagate them himself. Better nut trees will not only usually be secured from the nursery, but anywhere from two to four or five years time may be saved in bringing of the trees into bearing.

Those who are willing to study and practice diligently enough to acquire skill should not find the propagation methods adapted to nut trees unsurmountable. Such individuals should learn in a reasonable

time, propagation methods, and be able to produce high grade profitable trees.

Since nut trees do not usually come true from seed, this method of propagation cannot be relied upon. The grower is likely to secure from seed as many different kinds of sorts as seeds planted. And rarely is a seedling as good as our named and cultivated varieties. Where the farmer is capable of doing his own budding and grafting seedling trees may be grown as stocks for improved sorts.

Value of Good Nut Trees

The work of the Missouri Agricultural Experiment Station, as well as that of many other experiment stations, has shown conclusively that large, growthy, vigorous young nut trees are usually much more likely to succeed and become profitable, than weakly, stunted, slow-growing stock. It is false economy, therefore, for the farmer to buy or use for planting, inferior nut trees. Too much emphasis cannot be placed upon this matter as the success of nut groves may depend largely upon the vigor and health of the trees used for transplanting.

Culture of Nut Trees

Like the culture of deciduous fruit trees, nut trees to be a success, should be planted on rich, deep, well drained soils. Soils too poor or not drained well enough to produce good truck or grain crops should not be used for the culture of nut trees. After the trees are planted they should receive good cultivation, consisting of hoeing or plowing—or both—at intervals through the spring and early summer, in order to keep down grass and weeds.

Where there is not sufficient fertility to produce a good strong growth, fertilizers should be added. The best fertilizer in general for nut trees is barnyard manure. This should be used during the winter, or in the early spring as growth is starting. It may be placed around the trunks of young trees where it is scarce at the rate of a half dozen to a dozen shovels full. In order to prevent making a harbor for field mice which may girdle young trees, it is well to place the manure from twelve to sixteen inches away from the trunks of the trees. When applied to the soil, manure should be worked in by hoeing and plowing. Regular cultivations afterward to maintain the soil moisture and make

available plant foods, should be continued during each year until the trees are from six to ten years of age—after which cultivation may be discontinued providing the trees are able to make sufficient growth each year to maintain good production. It is important at all times that the grower study his trees carefully and see that they are healthy and vigorous and that a substantial growth is secured each season. Otherwise he cannot realize a profit from nut production and the trees are likely to be a disappointment.

Nut Tree Yields

Pecans, walnuts, and hickories, may produce a few nuts at an early age, but paying crops are not usually expected under ten years and a full crop of nuts is generally not received until the trees are from fifteen to twenty years old. An average crop ranges from one to twenty bushels. Production, as with fruits, will depend largely upon the culture the nut trees receive. Nut trees under good cultivation may in twelve or fourteen years, bear as many nuts as neglected trees at twenty-five years of age.

Profits from Nut Trees

No one should think of getting rich quick by planting groves of any of the nut trees mentioned above, neither is it generally advisable for farmers to plant large acreages to nut trees upon land which is well adapted for the growing of truck, grain, or orchard crops. If interested in nut culture, it is usually a wise procedure for the grower to start on a small scale, making his plantings on waste land or unaccessible land which is not well adapted to the growing of ordinary farm crops. Such land should, of course, be fertile and well-drained but it is not necessary that it be as level and as accessible as that generally used in crop production. The farmer who has had experience in nut culture may, of course, profitably and safely extend his plantings to a much greater extent than the beginner.

Truck crops such as potatoes, cabbage, watermelons, cantaloupes and strawberries may be grown successfully as inter-crops until the trees come into profitable bearing. The farmer may also frequently utilize to advantage the grass which grows beneath nut trees. Trees of large size are rarely injured by live stock, and as a rule all our common grasses do well when grown beneath them.

Timber and Nut Yields

Our greatest production of pecans comes from the bottom lands along the Mississippi River in Southeast Missouri. The main shipping points being Ste. Genevieve, St. Mary's, Menfro, Caruthersville and Hornersville. Pecans are also found in the Mississippi River bottom from St. Charles to Hannibal and in the Missouri and tributary river bottom lands from St. Louis to St. Joseph.

According to the United States census for 1920 Missouri has 107 million board feet of black walnut lumber, ranking first among the States of the Union.

In 1910 Missouri farms were growing 1060 pecan trees, while in 1920 more than 2000 farms were growing them, representing an increase of 47 per cent in ten years.

The bearing pecan trees in 1910 were listed at 49,000 and the non-bearing at 7,000, while in 1920 the number of bearing trees were 90,000 and non-bearing 35,000, which gives us an increase of 41,000 bearing trees and 28,000 non-bearing trees in a ten year period.

Our pecan production in 1909 was 147,000 pounds, while in 1919 it had risen to 550,000 pounds.

In 1910 the total black walnut production was 3,000,000 pounds. For more recent production, figures are not available but since there has been a great revival of interest in the production of this nut, a substantial increase has undoubtedly been made.

English walnuts were growing on 86 farms in 1910 with trees numbering 1214, while in 1920 only 34 farms reported English walnuts and the total number of trees were reduced to 321. This shows a marked decrease, less than half, in the number of farms growing English walnuts as well as about a 73 per cent decrease in number of trees. This is as it should be because the growing of English walnuts in Missouri is hazardous on account of the severity of our winters and only now and then do we find trees bearing nuts.

Nut Investigation of the Missouri Agricultural Experiment Station

The Missouri Agricultural Experiment Station, at Columbia, is growing on the experimental fruit farms, practically all of the named varieties of the black walnuts, hickories, and pecans adapted to Missouri

conditions. Our success in the propagation of the black walnut has been unusually good. Native black walnut trees of all ages have been successfully propagated by cleft grafting. Bearing trees which have been top worked or cleft grafted for five or six years generally produce as large a bearing surface and as many nuts as unworked seedling trees of the same size and age. Our grafting and budding work has not been so successful with hickories and pecans. In general we have found that the native seedling hickories and pecans are most profitably changed to improved or better varieties by budding during June and July.

Much information regarding the propagation, cultivation, fertilization, and varieties, has been obtained and it is hoped that this may be printed in bulletin form for the benefit of Missouri growers some time during the coming year.

We do not look upon this nut project as the most valuable of the Experiment Station, yet we do not believe it to be the least valuable. This is true because upon practically every Missouri farm there is ample space for the planting of nut trees, or there may be seedling walnuts, hickories and pecans which can be greatly improved for nut production by graftage without the loss of timber. Such nuts should not only be of great value for home consumption but a substantial source of income. Our improved native nut trees should produce large quantities of wholesome and nutritious food, supply valuable lumber, enhance the farm income, and beautify the landscape.

A Member: What method do you usually use in planting your trees, in preparing the ground for putting them in; do you use dynamite?

Mr. Talbert: We do not. We prepare it just as we would prepare it for a good wheat or corn crop, by plowing it deep and working it up in good shape and for Missouri conditions we find that generally late fall or early winter plowing is better than spring plowing. But we try to make a good seed bed. Regarding dynamiting, we have not found it beneficial. Some say, If we have a real hard pan would it not be advisable to use dynamite? I say, If you have such a hard ground as that, it is no place to plant a nut tree or apple tree.

DISEASES OF NUT CROPS IN THE NORTHERN UNITED STATES

By Dr. H. W. Anderson, University of Illinois

Commercial nut orcharding on a large scale is a comparatively new field of agricultural endeavor. For this reason very few observations have been made on the effect of the disease factor in this venture. We know for a certainty that crops of wild nuts of the kinds we are interested in are produced in the woods year after year with a fair degree of regularity. But when these same nut trees are placed under artificial conditions of culture the results may be entirely different. To illustrate this point we may draw upon the experiences of the fruit growers. Our native crab apples, while subject to most of the diseases of the cultivated apples such as scab and blotch, produced enormous crops of apples year in and year out, but when cultivated apple trees were grown in the same region it was soon discovered that the fungous diseases and insect pests completely ruined crops from a commercial standpoint. At first, however, our forefathers did not find it necessary to protect the apples by spraying but as the orchards became more numerous and new insects and diseases were introduced from foreign countries and from other sections of our own country, the necessity of protection became more and more acute until today failure to spray spells "ruin" to the orchardist.

We might picture large orchards of walnut, hickory, filbert, chestnut, etc., in the region such as southern Illinois, where thousands of trees of the same species would be associated. Some disease such as chestnut blight or leaf spot enters and becomes established. The nut culturists of this region have spent hundreds of thousands of dollars developing their orchards to the point where they are getting crops and are now ready to reap their reward. Instead the dread blight kills out the chestnut and the leaf spot defoliates and weakens the walnut, hickory and butternut, while the blight destroys all the filbert plantations. Or worse yet, some unknown, foreign disease is introduced and almost before we are aware of it, it destroys thousands of

trees. This is not a fanciful picture because it has happened time and time again in the history of horticulture. We might cite chestnut blight, citrus canker and white pine blister rust as examples. Therefore, it behooves the nut culturist to take thought of the nut diseases.

In the short time which has been allotted me I cannot take up the diseases of all our northern nut crops. For this reason I am going to dwell only on the diseases of the native nuts, omitting the English walnut with its bacterial blight and the pecan scab which is mainly southern in its range.

Few of the diseases of nut crops have been carefully studied and even where we know something about them on the wild trees we are not certain as to how they will act when introduced into the "cultivated" orchard. What I have to say, therefore, in regard to the probable effect of these diseases is more in the nature of a forecast, which, like some of our weather forecasts may prove to be wide of the mark.

Chestnut Diseases

Chestnut blight or canker: In 1912 I was fortunate enough to be employed by the state of Pennsylvania during the campaign to head off the chestnut blight in that state. I had an opportunity, therefore, to become intimately acquainted with this devastating disease. As most of you know it is now so wide spread that there is no longer any hope of saving the wild American chestnut from practical extinction. However, the commercial growing of chestnuts need not be seriously affected by this disease except in those sections where the orchards are in close association with the natural growth.

I will describe this disease briefly for the benefit of those who are not familiar with it. Although called "blight" it is really not a blight as this term is generally used. It is a canker disease which on account of its rapid development soon girdles the branches or young tree and thus causes the wilting and blighted appearance associated with the disease. The cankers are usually oval, slightly sunken, and on young limbs are conspicuous due to the fact that the bark of the canker is reddish brown in contrast to the normal dark green of the healthy limb. When the bark of a canker is peeled off there may be found tawny, fan-shaped growths of the fungous mycelium next the wood. The most conspicuous and characteristic symptom however,

is the appearance of numerous small brownish red pustules over the surface of the canker. These are the fruiting bodies of the fungus. (Specimens of bark showing these bodies were passed for examination).

This fungus owes its destructiveness to the facts that (1) It is a rapid grower, girdling large branches in a few months and killing good sized trees within two years, (2) It produces enormous numbers of spores or seeds within a short time after the cankers are formed. These are of two kinds but both are exfremely resistant to cold and drying and consequently are able to spread the disease with astonishing speed. In fact, there seems to be no weak point in the entire life history of this fungus and for this reason we should be very careful to keep it out of our commercial chestnut orchards.

Control of chestnut blight: The control of chestnut blight in commercial orchards is comparatively simple in spite of the failure to control it in the forests. The reason for this is that in an orchard the individual tree is of much greater importance than in the forest and greater pains can be taken to eliminate the disease. Of course, if one plans to plant a chestnut orchard it would be very unwise to select a location where the native chestnut occurs. The chestnut does well in many localities outside its natural range. There is little danger of the disease being introduced into plantations outside the area of the natural chestnut growth, provided one is reasonably careful to avoid securing nursery stock of any kind or other plant materials from the blight region. Should any trees show cankers, prompt and careful cutting out of the cankers will eliminate the disease. *Prompt and thorough work is necessary.* I will not attempt to describe the method of cutting out cankers since this proeedure is familiar to most of you but should you desire further information along this line I shall be glad to furnish it.

The fact that the native chestnut is being exterminated is to the advantage of the commercial grower of the better chestnut varieties since he can obtain a better market and be sure of increasing demands in the future.

There is a possibility in developing blight resistant hybrids by crossing our chestnuts with pure strains of Japanese and Chinese chestnuts. As many of you know the blight fungus was found to have been imported from China where it seems to do little damage on the native chestnuts. Most hybrids have proved susceptible to blight

but little work has been done along this line for the special purpose of securing resistance.

Chestnut Leaf Spot: One of the most serious diseases of the chestnut is a leaf spot caused by *Marssonia ochroleuca*. I have collected this several times in southern Illinois. During damp seasons it causes a decided reduction in the leaf area. It will probably never become serious enough to warrant spraying but no doubt it could be controlled by this method.

Strumella canker: A common canker of the oak is also prevalent on the chestnut. It is caused by *Strumella coryneoidia*. It frequently girdles the twigs and even large limbs and may prove to be serious. It is probable that this can be controlled by cutting out the cankers but the fact that the oaks are common hosts of this fungus makes it doubtful if cutting out would be a practical method since reinfection would constantly occur.

The chestnut is subject to the usual wood and root rots and has several other leaf spots of minor importance.

It should be remembered that the chestnut is a close relative of the oak and is consequently, subject to many of the same diseases.

Walnut, Hickory and Butternut Diseases

I class the diseases of these three nut trees together since most diseases are prevalent on all three hosts.

A leaf spot caused by *Gnomonia leptostyla (Marssonia juglandis)* is the most serious and wide spread disease of these three hosts. It is worse on butternut than on walnut but seems to be very erratic in its behavior on hickory nut. I have seen it cause almost complete defoliation on one hickory tree while neighboring trees seem to have suffered very little. It is probable that this is a varietal difference in susceptibility since hickories differ very markedly in their characters when growing wild. This point should be taken into consideration when selecting wild hickories for grafting.

This leaf spot causes large, dark brown irregular spots on the leaf and these are frequently so abundant that the entire leaf is killed. Even when not killed defoliation frequently results. Last summer I watched a seedling butternut tree which grew near my dining room

window. It was a very healthy specimen having grown about six feet in a single year. It seemed to have escaped the leaf spot until rather late in the season but when the disease did start it took only about three weeks to cause all but a few of the leaves to drop.

This fungus produces large crops of spores on the under surface of the leaves and these are the source of further infection. In addition the young twigs are attacked and it has been demonstrated in Europe that spring infection may take place from fresh crops of spores produced on these overwintering spots. But it is probable that infection also takes place from the dead leaves beneath the tree since the fungus lives over winter in these leaves and produces a crop of spores of different character from those produced on the twigs and leaves. These spores are capable of reinfecting the leaves in the spring. Little is actually known concerning the life history of this parasite and one must guess as to the best methods of control. Undoubtedly any practice which reduces the amount of shade in the orchard will aid in reducing the amount of injury from this disease. Destruction of the dead leaves underneath the tree during the winter or early spring would probably be of benefit. Dormant spraying would probably be of value since similar diseases on the other dormant plants are controlled by this method. Summer spraying will control the disease but the number and time of applications would have to be worked out experimentally.

It is evident from the above statements that we are sadly in need of some experimental work on the control of nut diseases of this type. I will take up this point later under some suggestions I have to make.

As most of you know, the butternut is a short lived tree. Many explanations have been given for this fact. One is that of wood decay while others believe that it is due to some special disease of roots. Much needs to be learned about this condition.

All three of these nut trees suffer from other leaf spots. The walnut has at least four others but none of them are of any great importance so far as we now know.

There are two powdery mildews on walnut and butternut and one on hickory. These are seldom serious but may prove of importance in the orchard and are certain to cause trouble in the nursery.

Wood rots are common on the walnut and butternut but not so common on the hickory.

A leaf spot of rather common occurrence is prevalent on the hickory but is rare on the other hosts. This is known as "leaf mildew" but is not the "powdery" mildew mentioned above. The fungus causing it is called *Microstroma juglandis*. The leaves show white powdery patches on the under surface early in the summer and later, yellowish spots are noticed on the upper surface. A witches broom effect on the shagbark hickory is supposed to be due to this fungus.

Filbert

Two "blights" are prevalent on the filbert. One caused by a bacterium, seems to be confined to the Pacific Northwest while the other, a fungous blight, is at present confined to the region east of the Rocky Mountains.

By far the more serious of these blights is the latter. It has been stated that this alone has kept the filbert industry from becoming established in the Eastern United States. The fungus, *Cryptosporella anomala* is prevalent on the wild American hazelnut throughout its range but is not virulent enough on this host to cause serious trouble. However, when the filbert becomes diseased, it is quickly killed back to the roots or to the main stem. It is certain that the filbert industry will be a very unsatisfactory venture until satisfactory methods of control are secured. I am informed by some growers that they are able to keep this disease in check but it will take a number of years to establish this beyond question. This disease is similar in its life history to the chestnut blight in that it is caused by a group of fungi known as the *Ascomycetes*. It produces enormous numbers of fruiting bodies, black or ash-grey in color, on the twigs and larger branches. The fungus girdles the branch causing a sunken constricted area.

It is probable that the control of this disease will be obtained by rigid cutting out and burning all affected branches. Also all wild hazel plants in the neighborhood of the plantings will have to be removed.

Another disease of filberts not known to occur in this country but common in Italy is caused by a species of yeast *(Nematospora coryli)*.

This disease is of special significance since there is no external evidence of the malady on the nuts before they are cracked. When cracked the kernels are seen to be partly shrivelled or otherwise badly deformed and quite worthless. It would be impossible to keep this disease from being imported into the U. S. as long as we allow any filberts to be brought in from Italy or other countries where it occurs. A very similar disease occurs on Lima beans in this country. It has been found in Northern Illinois and Virginia and is probably rather wide spread. I am of the opinion that the fungi are identical, although they have been given different specific names. If this proves to be true, we may expect trouble from this disease in the future.

Discussion

The one outstanding phrase in the previous discussion of nut diseases is "It is probable." I think I have scanned the literature on the subject of nut diseases with reasonable thoroughness. Numerous isolated facts are known but these facts do not give us sufficient knowledge to outline definite methods of control. It will be necessary for northern nut growers to obtain knowledge of their diseases much as the southern pecan growers have secured information on pecan scab or California walnut growers on bacterial blight. In other words the life histories of the fungi causing our common and destructive northern nut diseases must be carefully worked out. This is neeessary before control measures ean be satisfactorily applied. Then spray schedules must be tried over a series of years until the number and kinds of spray applications are established. Also, the life history studies will point the way to essential sanitary measures. It will in other words, eliminate much of the uncertainty which now exists and make nut growing as a whole less of a gamble.

We are fortunate here in the north in having the experience of the Southern pecan growers to guide us. We have a reasonably certain knowledge of what sprays can be applied to nut trees with safety and which spray mixtures will probably be most satisfactory. The fact that Bordeaux mixture can be used on nut trees is in itself of great significance since few fungi can escape when this fungicide is applied in the proper manner at the proper time. What we must learn now is when to apply the sprays. The nut industry is not yet profitable enough to permit the application of ten or fifteen sprays a year without knowing that these sprays are absolutely neeessary.

It should be the policy of this Association to interest the Northern experiment stations in the study of nut diseases and insects and try to secure for them sufficient funds to see that this work is properly carried on. Ultimately a nut orchard containing various nut varieties should be made available for experimental spraying work. But first of all a close study should be made of the habits of the fungi which are causing nut diseases in our northern states. At present these can be studied in part on wild hosts but this is only a temporary expedient, for their behavior, as I have intimated before, may be quite different on cultivated nuts.

The necessity of guarding against the introduction of diseases and insects into your orchards is a problem which all of you should consider seriously. The newness of nut culture makes this all the more important. Nursery trees are shipped from distant parts of the country and little is known concerning the pests of the nuts in the various sections of the country and in foreign countries. Think twice before you buy trees from any source and when you do buy them, inspect them very carefully for anything that looks like a diseased condition. If such is found, do not be satisfied until you *know* that you are not dealing with a harmful parasite which you might introduce into your own and your neighbors' orchards.

I would like to say a few words about the indiscriminate planting of nut trees such as was advocated last night in the address of our good friend, W. S. Linton, of Michigan. I believe this would be a serious mistake since on such trees insect pests and fungus diseases would thrive. It takes an expert to take proper care of trees and such experts would not or could not be employed to take care of all these trees. No one who has any knowledge of the fruit industry would advocate the planting of apple trees along all our highways. Such plantings would harbor many insects and diseases which would ruin the commercial apple orchards of the neighborhood or seriously increase the cost of protecting these trees against the pests.

TOPWORKING HICKORY TREES FOR THE BEGINNER

By Dr. W. C. Deming, Connecticut

On almost every farm in the country, where the hickory tree is indigenous, there are many such trees that may be topworked and made to bear choice nuts, instead of the poor ones that most of them naturally produce. Even on small places there are likely to be a few of these trees. The pioneer work of a few enthusiasts, in experimenting with grafting nut trees, has made this almost as easy as grafting apple trees, once the methods are understood. It is the object of this paper to describe one of these methods. Other methods are described, and a fuller discussion given, in a paper published in the fifteenth annual report of this association.

The idea of trying to perpetuate some fine nut tree, that they have come to know about, has occurred to many persons, and the natural thought was to do so by planting the fine nuts. But this has nearly always resulted in disappointment because the trees growing from this planting have hardly ever borne nuts as good as those from the parent tree. Such trees are also often very long in coming into bearing. I know of three trees, resulting from the planting of several nuts, that did not bear until the 35th year. Often, too, they are very unfruitful after beginning to bear.

Just as we get our good fruit trees of all kinds by budding or grafting seedling trees with scions from parent trees known to bear fine, or named, varieties of fruit, so must we graft or bud seedling nut trees in order to get fine, or named, varieties of nuts. Then the nuts produced will be like those borne by the parent tree, and the grafted trees will begin to bear as soon as will grafted apple trees, in from three to six years.

There are several species of hickory native in the North, such as the common shagbark, the western shellbark, the mockernut, the pignut, the bitternut and, over a more limited range, the pecan, or pecan

hickory. There are also numerous hybrids between the hickory species. So far as we know any one of these hickories will take and grow when grafted on any of the others. The most, and least, desirable combinations have not been finally determined, but this much may be said about the least desirable; that the final results with pecans topworked on shagbark have not been satisfactory, and that some of the hybrids fail to live long when grafted on species other than the two which were their parents. The question of compatibility is now being worked out and will soon be better known. Meanwhile, bearing in mind these cautions, especially with regard to the hybrid hickories, one may begin topworking, using whatever hickories are at hand as stocks, on which to graft whatever scions of good hickories can be obtained.

I suggest that, in getting a knowledge of, and skill in, grafting nut trees, it will be well to practice with scions cut from any hickory tree rather than to use up valuable scions in the first attempt. It is likely to take some time to learn how to graft successfully, especially if you have to do so from descriptions. An hour or two with an experienced grafter will teach more than many hours of reading. Apple trees are very easy to graft and good to practice on.

Equipment

The first need is a good knife. The grafting knife made by Maher & Gross, with a sturdy handle and blade, is a good one. Shaping the scions is much easier if the knife is sharpened with a slight bevel on the upper side of the edge so that the flat side is next to the scion in making the cut. This bevel must be made on an oil stone by the grafter as the knives are not sharpened in that way by the makers.

Pruning shears are needed to cut up the scions and to trim the stocks.

A sharp saw with medium teeth with a good set is necessary to cut the stocks. I like a medium-sized carpenter's saw, but there are many forms of pruning saws. A double edged saw is not to be recommended.

For binding the scions in place raffia is the most used material. It can be bought at seedsmen's supply stores. It should be dampened before using. Soft twine, also, may be used.

One of the greatest advantages ever made in the art of grafting is the use of melted paraffin for waxing, due to Dr. Morris. There is a special melter for the paraffin, devised by Dr. Morris, but a useful one may be made at home from a lard pail with a bicycle lantern set into the bottom, a few holes punched for draft, and a small saucepan set into the top to hold the paraffin. Paraffin can be bought cheaply in the form of Parowax at any grocery store. Complete the necessary equipment with a small, rather stiff, ten-cent paint brush.

Scions

One of the difficulties at present is to get scions of good varieties. If you know of a tree where you can cut them do so when the buds are completely dormant, in late winter or very early spring. Select the plumpest and longest terminal twigs and cut them at least a foot long with three or four inches of two-year-old wood at the butt end. Even after growth has started a section of stem may often be found where there are good dormant buds and such scions may be used successfully.

Until they are wanted for grafting, scions must be carefully kept. This means that they must be kept moist enough to prevent the bark from shrivelling and dry enough so that the buds do not start to grow. A man must learn how to do this by experience with his own conditions. Scions packed away tightly for any length of time are apt to go wrong, either by drying too much, by being too moist and starting to grow, or by heating, molding or rotting. A simple way to keep them is to dig a hole about 3 feet deep in the ground outdoors, in a dry and sheltered place where water can never reach them, as under the back porch. Have the scions in convenient lengths of one to two feet. Wrap them in a bundle, or bundles, in a light tar paper, which helps to prevent mold. Leave the ends open for ventilation. Lay the bundles in the bottom of the hole and cover the top of the hole with an old carpet, or several newspapers. This description gives a general idea of the conditions under which scions should be kept. A man may vary it according to his own conditions, bearing in mind the principles. It is of vital importance to the success of grafting that the scions should be in good condition. The usual mistakes are in keeping them too wet and too much wrapped up. They should be examined frequently to see that they are keeping well.

Scions may be obtained from the owners of parent trees, or from other experimenters and grafters.

Time of Year for Grafting

Experts have grafted nut trees in nearly every month of the year. But for beginners the best time is from the breaking of the buds in spring until about the first of July. That is, from the time the bark begins to slip until a date after which there is likely to be too little time left for grafts to grow and harden their wood before freezing weather. It will be noted that this is different from the former practice of grafting while the trees are still dormant, during the cold and unpleasant weather of early spring. If grafting is done before the bark will slip a different method must be used from the one here to be described. For a description of this see the fifteenth (1924) annual report of the Association.

Preparation of Stocks

Vigorous young trees not over three inches in diameter, growing in the open, make the best stocks. Stunted trees, or those growing in heavy shade, make poor stocks. Cut off the top of the tree at a convenient level, say about breast high, leaving about one third of its branches. If this leaves too many branches below the cut they may be pruned back. The cut may be made higher if necessary to get above a sufficient number of side branches, or if the trees are in a pasture cows will surely eat the tender shoots of hickories if they can reach them. It may be necessary to use a step ladder if the point for grafting is high. Make the cut just above a branch of medium size, which will keep up the circulation of sap, the life blood of the tree. Some grafters advise that the cut be made with a heavy slant, but I prefer to cut with a slight slant, or none at all, and then to set from two to four grafts according to the size of the stock. The best of these is allowed to grow to form the new tree. The others are pruned back for scion-wood year after year. They hasten the healing of the stump and prevent decay.

My own practice is to cut back these stocks at the time I do the grafting. If about a third of the branches is left there is no trouble from excessive sap-flow.

The Operation of Grafting

Apply the point of the knife to the edge of the bark on the cut-off stock, at the place selected for the graft, and make a cut through the

bark and down to the wood, one and one-half inches long, undercutting the bark slightly to the left and slanting the cut very slightly to the right. Now hold the butt end of the scion alongside this cut and make another similar cut to the right of the first so that between the two cuts a tongue of bark will be marked out, of the same width as the scion, slightly undercut at both sides, and slightly tapering toward the lower end. With practice a very accurate fit can be made. When the tongue of bark has been thus marked out, but before it is raised, proceed to prepare the scion. With the pruning shears cut the scion five or six inches long. If too short it is difficult to hold in the hand while cutting the scarf. The scions should have two or more good buds, not necessarily large buds nor terminal buds. Hold the scion in the left hand firmly with the butt pointing away from the body. Hold the knife in the right hand with the thumb across the fingers as in making a fist, not on the back of the knife. Apply the edge of the knife to the scion an inch and a half from the butt. Then, holding the handle of the knife forward as far as possible toward the butt of the scion so as to make a draw cut, not a shove or push cut, make a scarf an inch long or longer with one stroke of the knife. This is easy to do with practice if the knife is very sharp and bevelled on the upper edge, as already described, and if done with a strong draw cut. This leaves the scion with a clean, true scarf an inch long or longer, terminating in a point. It is usual, but not necessary, to turn the scion over and cut a thin slice from the last quarter inch of the tip, just cutting through the bark to the wood but not making a heavy bevel.

Now with the tip of the knife slightly raise the upper end of the tongue of bark on the stock and insert the point of the scion with the cut surface toward the wood of the stock. Push the scion, or tap it with the blade of the knife held flat, downward until it settles firmly into place. Slice off the projecting tongue of bark nearly level with the general surface of the stock. This dovetailing of the scion into the stock should hold it firmly in place. When the bark of the stock is thick it is possible to dispense with tying, if the fit is perfect. But it is always safer to tie the scion firmly in place with raffia or soft cord. Have the raffia slightly moist. Take two or three turns of the raffia close to the edge of the stock, binding the scion tightly to the wood. Continue the winding with two or three turns around the stock at the level of the upper end of the tongue of bark where it was cut

away. This forces the lower end of the scion into place. Slip the end of the raffia under the last turn or two and pull it tight. The graft is then ready for waxing.

Waxing

A very important point about the use of paraffin for grafting wax is that it shall be at the right temperature. Many make the mistake of using it too cool. It must be so hot that when applied it runs and spreads forming a thin film. If too cool it will not penetrate the crevices, and when it get cold it is likely to crack and flake off. The right temperature is just below where the parafin begins to smoke. If it smokes it is too hot. If it does not spread at a touch it is too cool. Apply it with a light quick touch to the whole site of the operation, the scion, its tip, buds and bark, to the tongue of bark on the stock, being sure to apply it low enough to cover the lower ends of the incisions in the bark, which often escape notice. The top of the stock must also be completely covered with paraffin. The method of tying described, making two bands around the graft instead of completely covering it with the raffia, allows the hot paraffin to run under the raffia wherever there is a space, thus leaving no open spaces whatever in the whole graft where sap might accumulate and spoil it by fermenting. When the graft is finished the paraffin should only be noticeable by its shining appearance. There should be no blobs and dribblings.

Now label the graft with a painted wooden label with copper wire fastening, with the date, the name of the variety and any other record desired. A good thing to which to fasten the label is a small staple driven into the stock. Pass the *doubled* wire through the staple and twist it up firmly so that it will not sway in the wind. By using this method of labelling the tags will not have to be shifted about and they will stay in place and remain legible for a long time. Do not separate the wires and leave the label loose and swaying in the wind or it will be sure, sooner or later, to wear away the wire and become lost.

After Care

In from ten days to three or four weeks the grafts should begin to grow. They should be inspected at least once a week, at first, any imperfections in the waxing or tying made good, and bud-eating worms

picked off. It is most important to rub off at once any new growth that appears on the stock. Often it appears and grows with great rapidity and may absorb the sap and starve out the growing grafts. Often the grafts, too, will grow with great rapidity. They must then be supported or they will be blown out, broken off or fall of their own weight. A convenient way to support the grafts is to cut a sapling two or three feet taller than the stock, sharpen the butt end and push it into the ground at the foot of the stock. Then tie it firmly to the top of the stock with strong cord and tie the new shoots to the upright thus formed with raffia or soft cord. Continue the tying from time to time as necessary.

The following spring, before growth starts, the strongest shoot may be chosen to form the new tree and the others cut back, leaving buds on each so that they will throw out new shoots. This helps to heal the stump and prevent decay, and furnishes scions for future grafting from year to year.

At this time also, or earlier during the dormant season, the removal of the limbs left on the stock must be begun. While at all times new growth must be rigidly kept off it is a matter of judgment in each case how much of the old limbs should be removed. If the stock is small, and the grafts have made a good growth, all of the limbs may be cut away. When the tree is large only part of the limbs can be taken off. If too much is cut away one of two things may happen. Either the tree may die for lack of nourishment for the roots, or the grafts will take on such rapid growth that they will sprawl and spindle so as to make it difficult to support and train them into a good head.

(On account of space and expense limitations, and in accordance with the vote of the convention in 1923, the transcript of the stenographer's full report has been unsparingly cut and it has also been necessary to abstract some of the papers read instead of publishing them in full. Copies of the full report are in the hands of the secretary).

Mr. Henry D. Spencer of Decatur, Illinois, read a paper entitled, "Some Methods of Arousing Public Interest in Nut Growing."

Mr. Spencer mentioned as among the obstacles to the success of the efforts of the nut growers associations that it is so hard to start a new idea and that the people are so ignorant of the possibilities of

the soil and climate about them. He illustrated this with instances from his own experience. He stated that the chestnut, chinquapin, hickory, pecan, hard shelled almond, butternut, hazel and filbert and walnut will grow wherever the oak will grow.

He suggested the formation of "Bird and Tree Clubs" in every town as a means of interesting the people in the possibilities of horticulture primarily, and eventually in nut growing. The Boy Scouts, Mothers' Clubs and Parent-Teachers' Associations should also be enlisted. "The education of children in the beauty of trees, shrubs and flowers might well be called the primary grades of nut culture. The planting, cultivation and pruning of nut trees come in the high school courses. The budding, grafting and propagation of trees, the creation of new varieties, equal a college course."

Mr. Spencer suggested the planting of memorial groves of nut trees in honor of great civic leaders and others of noble character. These would serve, also, to demonstrate to the public what kind of nut trees will grow in that vicinity. The Farm Bureaus should persuade farmers to plant groves of nut trees on their farms. One township might thus be made an object lesson to a whole state. Avenues of, and individual nut trees should be planted as memorials to the young men who have given their lives in war for us.

Mr. Niblack talked briefly, enthusiastically supporting Mr. Spencer's views.

Mr. F. A. Bartlett of Stamford, Conn., read a paper on "Tree Surgery and Food Production." After stating that all tree owners are eventually confronted with the problem of preserving them from internal decay, instancing especially topworked nut trees, Mr. Bartlett went on to speak of the delicate structure of the living parts of a tree, especially the cambium layer, explaining how a wound on the bark of a tree is healed by the rapid multiplication of the living cells in this cambium layer due to the release of pressure, which causes the cambium, or new tissues, to roll over the broken area.

Mr. Bartlett gave an interesting review of the history of tree surgery showing its great advance in the past twenty-five years and the very highly developed and specialized profession that it has become. He spoke of the 20,000 different kinds of insect enemies of trees, most of which exist in four stages making 80,000 forms of insect

life to be recognized. There are also thousands of forms of fungous diseases.

Mr. Bartlett then described methods of treating various forms of disease and injury to trees by applications of hot paraffine, paint, tar, asphalt and other protectives, the preparation and treatment of cavities, the bracing of weakened trees, emphasizing that trees often suffer from lack of plant food and it may be necessary to bring them back to a good state of nutrition before they will respond well to the methods of tree surgery.

Mr. Bartlett also described a new method of treatment called "Heal-Collar" by which the edge of a cavity is treated by surgeon's plaster, waterproofing, roofing paper and a backing of elastic cement, which prevents the bark from drying out and stimulates new tissues to a degree never before known. Cement is no longer the material of choice for the filling of most cavities. Flexible, light Magnesite fillings are preferable. Power driven burs and chisels are now being used in cavity excavations and new and improved methods are constantly being introduced.

Mr. George W. Pierce read a paper on "Nut Growing on the Pacific Coast."

After speaking of the wonderful natural productiveness of that region and its great development, he gave a historical review of nut culture there, instancing the black walnut as of little commercial importance, the English walnut as the nut of most general distribution and greatest importance, with a present production of 35,000 tons, and the almond as second in importance with a present production of 10,000 tons. The almond is a tree requiring the greatest care in the selection of varieties, in soil and in climatic conditions. More mistakes are made in the planting of the almond than with any other nut tree. Excessive moisture is fatal. Draughts of cold air and late spring frosts are injurious. Interplanting of varieties is necessary for good pollination. About 1875 Mr. A. T. Hatch of Suisun brought out a number of distinct and highly improved varieties, the chief ones being the Nonpareil, the I X L and the Ne Plus Ultra. These are the best table varieties in California if not in the world. The almond comes into bearing in from three to four years from time of planting. Trees should not be planted less than 25 feet apart and thirty feet is better.

The pistachio is grown to some extent but there are no large orchards and but few bearing trees. It may yet prove a commercial success. The government has sent out 25,000 trees.

The chestnut has not been grown extensively anywhere on the Pacific Coast. But little progress in planting has been made although the tree is said to be prolific and to grow on heavy soil.

The pecan is found in many widely separated districts. It grows rapidly, is hardy and is more generally found as a shade tree than in orchard plantings. In some sections they bear fairly well but more generally they are shy bearers.

The filbert seems to do best in the northern sections. Though the present output is small the trees are thrifty and the outlook is promising. The estimated yield for the present year is 75 tons.

Peanut growing has been largely abandoned on account of competition from the cheap labor Japanese product.

It may be assumed that somewhere in the Pacific Coast states can be found extensive sections adapted to the production of almost any variety of nut produced elsewhere in any temperate or semi-tropical climate. Competition from the cheap labor products of other countries must, however, be taken into consideration.

Dr. John Harvey Kellogg of Battle Creek, Michigan, read a paper on "The Supreme Value of Nuts as Human Food." This paper has been published in full, with illustrations, in the magazine Good Health and copies may be had by writing to Good Health Publishing Co., Dept. 12, Battle Creek, Michigan. It is possible to give here only a brief summary of Dr. Kellogg's valuable address.

Dr. Kellogg believes that the fear that this country can never produce enough food to support a population of more than two hundred million people is groundless. With proper methods of production and distribution it could feed a billion or even the whole world. At present more than three-fourths of the food we produce goes to feed our domestic animals and this is a very wasteful method of producing food for ourselves. Man originally lived on the products of the forest and only took to eating meat when these products grew scarce. Our present day diet is unwholesome and we should return to a diet of fruits, nuts, vegetables, seeds and milk. Over half the

human race subsists on a diet that contains no meat, or only in minute quantities. Dr. Kellogg believes, and quotes authorities who advocate, that we should adopt a two-story form of agriculture with crop-producing trees, largely nut trees, set far apart so that field crops may be grown between them. The nut is the very quintessence of human nutriment because of its richness in protein and fat especially. It is not to be regarded as a substitute for meat but rather we should consider that meat has been substituted for nuts. They were the chief food staple of primitive man. Immunity from disease and splendid health result from a diet wholly without meat. Nuts are absolutely free from impurities and the danger of carrying disease. They supply not only everything which meat supplies, and of the finest quality, but also essential elements which are lacking in meat, notably lime. Nuts, unlike meat, are free from acid producing tendencies which cause hardening of the arteries, high blood pressure and kidney disease.

Dr. Kellogg believes that we should encourage the planting of nut trees on our farms and along our highways and that we should appeal to the primitive appetite of our boys and girls for nuts for the promotion of nut culture. He feels that this association is doing a very important work in advocating nut culture and predicts that those who have labored so long as pioneers in the nut growing industry will be honored in the future as public benefactors.

THE NUT FLORA OF CANADA

J. A. Neilson, Ontario Agr. College, Guelph.

During the past four years the writer has been devoting a limited amount of time to a study of the occurrence and distribution of the native and exotic species of nut trees in Canada. As a result of these studies some interesting data have been obtained which show that the nut bearing flora of Canada is a fairly comprehensive one for a country of northern latitudes. By way of explanation I would like to say that a very small amount of my time is available for nut tree survey work in only one province, and consequently much remains to be done before complete data are available. Furthermore, it should not be forgotten that Canada is an immense country and that it takes a long time to make a study of any one branch of plant life.

The major part of the data presented in this paper today was read at the Rochester (1922) meeting of the Northern Nut Growers' Association, and, therefore, those who were present at that meeting will not likely get much new information. Our audience today, however, is composed mainly of people who may not be familiar with Canada, and therefore it gives me pleasure to present to the people of this meeting some facts relative to the nut bearing flora of my native land, and to tell you something of the progress of Canada's newest branch of horticulture.

Geographical Distribution of Nut Trees in Canada

The chief native nut trees are the black walnut, butternut, (white walnut), hickory, chestnut, beech and hazel. Of introduced nut trees, there are Persian, Japanese, Manchurian, and Chinese walnuts, European, Japanese and Chinese chestnuts, pecans, almonds, filberts, tree hazels and the ginkgo.

For convenience these various species will be discussed in groups rather than as native and introduced trees. The data relative to the distribution of the species described in this paper is based on information obtained through correspondence, personal observation and the

latest references. In so far as it pertains to native nut trees, it is believed to be accurate, but in reference to introduced trees, it may not be complete, as it is difficult to determine accurately the distribution of exotic nut bearing plants.

THE WALNUT GROUP (Juglans sp.)

In this family there are seven representatives, the black, the butternut or white, the Persian (English), the Chinese, the Manchurian and two species of Japanese.

The Black Walnut (Juglans nigra)

The black walnut is one of our finest native trees. It grows to a large size, sometimes attaining a height of 100 feet and a trunk diameter of five feet. When grown in the open it makes a beautiful symmetrical tree having a large rounded crown with drooping lower branches. Contrary to popular belief the native walnut grows quite rapidly and in some cases bears quite early. From one lot of nuts planted by the writer a tree grew to a height of thirty-seven feet, with a trunk diameter of fourteen inches, in eighteen years and began to bear in six years from planting.

The native walnut occurs quite abundantly in a belt of country bordering on Lakes Ontario, Erie, St. Clair and Huron, but has also been planted north and east of its native region, and does well when protected from cold winds. It is not definitely known how far north the black walnut can be grown, but it is believed that it should not be planted north of a line extending from Ottawa to North Bay.

Some good specimens of the black walnut have been planted in the valleys of British Columbia and along the coastal section. There is also a fine grove growing near Montreal on the estate of the late Sir Henry Joly De Lotbinere. Many of these trees in British Columbia and Quebec are now bearing and some are yielding very good nuts.

The Butternut or White Walnut (Juglans cinerea)

The butternut, or white walnut as it is sometimes called, is much hardier than the black walnut and has a wider distribution in Canada. It is found in Nova Scotia, New Brunswick, Prince Edward Island, Quebec, Ontario, Manitoba and British Columbia. In southern Mani-

toba at Burnside, there is a grove of butternut trees that have grown to a fair size and borne several crops of good nuts. These trees were grown from nuts introduced from Bruce County in Ontario, many years ago, and serve to show the hardiness of the species.

Japanese Walnuts (Juglans cordiformis and juglans sieboldiana)

The Japanese walnut is represented in Canada by the common type (Juglans sieboldiana) and the heartnut (Juglans cordiformis). There are also hybrids between the Japanese walnuts and the butternut that are erroneously called the Japanese walnut.

Both species are believed to be as hardy if not hardier than the black walnut, having been grown and fruited in sections where the black walnut does not occur. The Japanese walnut has been planted to a limited extent in Ontario with Ottawa as the northern limit in the east and Clarksburg in the west. There are many fine trees of the common type growing in the region extending from Toronto westward to Sarnia and southward to the lakes.

The heartnut and the common type are also grown quite extensively in British Columbia, especially in the interior valleys of the southern section of the province. Mr. David Gellatly of Gellatly, B. C., who has done more for the nut culture in that province than any other man, has located several fine heartnut trees and is now propagating the best of these by budding and grafting. Mr. Gellatly sent me several good specimens, which are shown in the collection on the table set aside for Canadian nuts.

The largest and probably the finest heartnut tree in Canada is located at Jordan Station on the farm of Mr. Sylvester Kratz. This tree is 35 feet tall, 2 feet in diameter and spreads about 60 feet across the branches. It is also quite productive, having yielded more than five bushels of husked nuts in its best year and other good yields have been secured.

I have bought the crop on Mr. Kratz's tree for three years in succession and have distributed thousands of these nuts throughout Canada for trial planting. Some interesting results are expected, especially in connection with the possibility of some valuable hybrids being produced.

Another good tree has been located at Scotland, Ontario, which

bears a nut of fine cracking quality. Some of these nuts were sent to our secretary, Mr. C. A. Reed, and to Mr. J. F. Jones of Lancaster. Both of these gentlemen reported favorably on the flavor of the kernel and particularly on the cracking quality. This tree is on the property of Mr. Claude Mitchell.

A few heartnut trees are also growing nicely near the city of Montreal on the estate of T. B. MacCauley, President of the Sun Life Assurance Company of Canada.

The hybrids between the butternut and the Japanese walnuts grow even more rapidly than either of the parent types. One of these hybrid trees growing near Grimsby attained a height of thirty-eight feet and a trunk diameter of eleven inches in nine years from the planting of the nut. The hybrid between Juglans sieboldiana and the butternut appears to be quite hardy, having been grown and fruited near Quebec city.

Several interesting and rather valuable hybrids between the heartnut and the butternut have been found near Vineland and Jordan Station in Ontario. The best of these hybrids bears a nut that is almost a perfect combination of the characteristics of the two parents. The nut is nearly as large as an average butternut and has the form of the heartnut. The shell is rougher than the heartnut but not as rough as the butternut. It can be easily split in halves and contains a kernel of heartnut shape with a flavor decidedly like the butternut. The husk has the stickiness of the butternut and, like the heartnut, it may be easily removed.

This tree has made a rapid growth, being about thirty-eight feet tall and over twelve inches in diameter at twelve years from planting.

The Persian (English) Walnut (Juglans regia)

This member of the walnut family succeeds best in sections having moderate summer temperatures with a good rainfall, and comparatively mild winters. It has been sparingly planted throughout the Niagara district, and appears to thrive very well. In southern Ontario there are about 250 seedling trees of bearing age beside several hundred more young trees which have not borne nuts. Approximately seventy-five percent of the bearing trees are found in the Niagara district and the remainder are chiefly in the Lake Erie counties.

In the Niagara fruit district some fine trees have been located in or near the following places: Hamilton, Grimsby, Beamsville, Vineland, St. Catherines, Port Dalhousie, Niagara on the Lake, Queenstown, St. Davids, Virgil, Fenwick, Niagara Falls and Campden. Outside of this district thrifty trees have been located at or near Port Dover, Coarkson, London, Windsor, Chatham, Port Colborne, Hensall, Ridgetown, Kingsville, Cottam, Dresden, and St. Williams.

Under favorable conditions of soil and elimate the trees grow quite large and make fine ornamentals. The largest and probably oldest tree in Ontario is located near Vineland Village. It is about five feet in diameter and nearly sixty feet tall and is said to be ninety years old. From this tree fourteen bushels of nuts were gathered in one season and other yields have been occasionally secured.

Like the Japanese walnut the English walnut has been planted to a considerable extent in British Columbia, particularly in the fruit districts of the mainland and on Vancouver Island. Several good varieties are now being grown and the foundations of a valuable industry are now being laid.

The Chinese Walnut (Juglans regia sinensis)

The Chinese walnut is the eastern form of the Persian walnut (Juglans regia) and is considered by some botanists to be praetically the same species. It has been grown in China for thousands of years and is said to thrive in regions where the climate is more severe than in North America where the Persian walnut can be grown successfully. For this reason some nut culturists believe that it may prove to be hardier than the Persian walnut, and hence it will be better adapted to the Northern United States and Southern Canada. It has been found to be hardy at the Arnold Arboretum, Jamaica Plains, Mass. and should, therefore, be adapted to southern Ontario and British Columbia, provided stock for planting were obtained from the most northern area of its growth in China.

The Chinese walnut is now being tried at the Vineland Experiment Station and at several other places in Ontario. The majority of these trees were grown from nuts which came from northwest China, but a few were obtained from the Bureau of Plant Industry at Washington. There is also a fine tree about eight years old growing on the property of G. H. Corsan at Islington near Toronto.

THE HICKORY GROUP (Carya sp.)

This is the most valuable native species for the production of nuts. It occurs in Ontario in the region extending from the southeastern shores of Lake Huron northeastward to the border of the Province of Quebec and southward to the lakes and the St. Lawrence. In Quebec it is confined to the southwestern section.

The shagbark occurs most abundantly and thrives best in the vicinity of the great lakes and their connecting rivers, but it does well at some distance from the lakes.

Other species of hickory are: the bitternut (Carya cordiformis), the mockernut (Carya alba) and the pignut (Carya glabra).

The bitternut has the widest range of any native hickory, occurring from Montreal westward to Collingwood and southward to the St. Lawrence River and the shores of Lakes Erie and Ontario. The tree does not usually grow very large, being from fifty to seventy feet in height and one to two feet in diameter. The nut is rather small but has a thin shell and contains a kernel with an extremely bitter flavor; hence the name bitternut. The nuts are useless because of their bitter flavor but the tree makes a good stock for grafting with superior types of shagbark-bitternut hybrids. It also offers interesting possibilities as a parent in crossing with desirable types of the shagbark and northern grown pecans.

The mockernut is a tall tree and occurs in a strip of territory bordering on Lakes Erie and Ontario. It produces a large nut with a thick shell and a small kernel which is generally disappointing; hence the name mockernut. Because of this undesirable characteristic, it is not of much value as a nut tree, but like the bitternut it may be top-grafted to better sorts.

The pignut grows from forty to sixty feet in height and up to three feet in diameter and occurs in the Niagara district and in the Lake Erie counties. The nut varies considerably in form and size and flavor of kernel. The usual shape is oval. Some are pear shaped, and others again are broader than long. In some nuts the kernel is bitter while in others it is sweet. A few variations of this species have been located which are considered valuable for their nuts.

The Pecan (Carya olivaeformis)

Pecan trees have been grown for some years at several places in Ontario. In the vicinity of Richmond Hill there is a small grove of trees produced by planting nuts from Southern Indiana. Some of these trees are fifty years old and are about thirty-five feet tall. They appear to be quite healthy but do not bear ripened nuts except in the most favorable seasons. There are also a few thrifty bearing trees near Simcoe which were grown from nuts obtained from Southern Missouri and at Niagara on the Lake there is a small plantation of seedling and grafted trees. An interesting example of the ability of a tree to thrive far from its native haunt is seen in a pecan tree growing on the grounds of Mr. Richard Martin of Hamilton. This tree grew from a nut obtained from a tree in San Antonio, Texas in the autumn of 1914. It is now 4 inches in diameter, 18 feet tall and appears to be perfectly hardy. All of the pecan trees in Ontario appear to be quite hardy and the grafted trees particularly are making a good growth.

This fine nut tree requires a longer growing season and more heat units to mature a crop than are generally found in Ontario and, therefore, it cannot be recommended for planting except where it is desirable to grow a rare ornamental tree which might occasionally produce ripened nuts.

THE CHESTNUT GROUP (Castanea sp.)

The American Sweet Chestnut (Castanea dentata).

This fine native tree is found in that part of Ontario extending from Toronto westward to Sarnia and southward to Lake Erie. It has also been planted at several points outside of its natural range and appears to be doing well. Good specimens of these trees have been observed or reported as growing nicely at Ottawa, Newcastle, Goderich, Port Elgin and Midland.

Under favorable conditions of soil and climate it grows to a large size, sometimes attaining a height of ninety feet and a diameter of six feet. When grown in a dense stand it develops into a tall straight tree, but in the open it forms several heavy branches and makes a broad round topped head.

It has been said that Canada and the United States have more in

common than any other two countries. This is particularly true when it comes to plant diseases and insect pests. With reference to the chestnut, we like you, have the chestnut blight in a severe form. Many of our grand old native chestnut trees are infected with the blight and are rapidly dying. It is only a matter of time when all our chestnuts will have disappeared unless we can find a resistant strain or can introduce immune varieties.

EXOTIC SPECIES OF CHESTNUT

The Chinese Chestnut (Castanea mollissima)

Inasmuch as very few foreign chestnuts have been planted in Canada comparatively little can be said regarding their suitability for our conditions. These Chinese chestnuts have been grown at the Arnold Arboretum near Boston, Mass., and have been found to be hardy and more or less resistant to blight. This species is a small spreading tree rarely growing to thirty-five feet in height, generally much shorter, bears large, sweet nuts and is said to bear heavily and early. The flavor of the nuts is said to be superior to the Japanese or European species, and is almost as good as the native sort. The hardiness, productiveness, blight-resistance, good quality of nut, and precocious bearing habits would indicate that it should be extensively tried in Canada where the native chestnut is likely to disappear as a result of blight. It is also a beautiful tree and makes a desirable addition to our list of ornamental trees. The Chinese chestnut is now being cultivated in British Columbia and Ontario to a limited extent.

The Japanese Chestnut (Castanea crenata)

This species has been planted in a few places in Ontario and British Columbia, and appears to be quite hardy. The tree is a small spreading grower, rarely attaining a height of forty feet. It bears early and heavily and produces very large nuts which are found in burrs, in numbers varying from three to seven. The flavor of the nut is inferior to any other known species of chestnut when eaten raw, but when cooked is very good. The Japanese chestnut is reported to be moderately resistant to blight and should, therefore, be suitable for planting in southern Ontario, especially outside of the region where the native chestnut occurs.

The European Chestnut (Castanea sativa)

This species of chestnut is variously known as French, Spanish, Italian and European Chestnut. It is extensively cultivated in Italy, France and Spain and Portugal, and it forms an important article of food for the people of these countries. It is also grown to a certain extent in southern England.

Like the native chestnut it is susceptible to chestnut blight and, therefore, cannot be recommended for planting in Ontario except where it can be grown several miles distant from the native sort. A few good trees of this kind are growing and bearing well in the Niagara district and at other places in southern Ontario and British Columbia.

THE HAZEL GROUP (Corylus sp.)

Hazels of various kinds occur over a wide range of the earth's surface, being found in North America, Europe and Asia. There are at least fifteen different species and these vary in size from small shrubs of four to six feet in height to immense trees 120 feet tall and six feet in diameter.

This family of plants is represented in Canada by two native species, the common hazel (Corylus americana) and the beaked hazel (Corylus rostrata). The common hazel is generally a small bush from four to six feet in height, but the beaked hazel is usually larger. In the vicinity of Hudson's Bay it is reported as growing to the size of a small tree, and on the Pacific coast is said to attain to a height of twenty feet on suitable soils. The hazels are the hardiest nut bearing plants in Canada, being found from the Atlantic to the Pacific and from the southern boundary up to Hudson's Bay and Peace River district.

The native hazels do not usually equal the European hazels in size of nut and productiveness but are extremely hardy, and would doubtless be worth planting where filberts and cobnuts cannot be grown. Superior strains of the common hazel have been discovered and are now being cultivated in the northern states and Canada.

Filberts (Corylus avellana)

Filberts have been introduced into Canada and are doing well. In some cases the trees are quite large, attaining a height of twenty

to twenty-five feet and a diameter of from four to twelve inches. Good specimens have been found in Ontario at Guelph, Grimsby, Simcoe, Victoria, St. Williams, Port Burwell, Tyreonnell, Exeter, Ancaster, Port Ryerse, Glencoe, Cedar Springs, Chatham and Wolfe Island. The plantation at Wolfe Island was established in 1830 and is said to have done well for more than 70 years. At Port Ryerse there is a small grove over sixty years old and at Exeter, Tyreonnell and Ancaster the trees range from forty to fifty years of age. These trees appear to be quite hardy and healthy and some are bearing fine nuts. The nuts vary from round to oblong and are larger than the majority of the native hazels.

The great majority of filbert trees growing in Ontario were introduced from England more than fifty years ago or were produced from these introductions, but unfortunately no records of varieties were kept and, hence, no definite data are available concerning these varieties. The fact that some of these original introductions have been growing for more than half a century is indicative of their hardiness, and if trees yielding the best nuts were selected for planting very good results might be secured even if no variety name is known.

Filberts are being cultivated in British Columbia more extensively than any other part of Canada. Varieties such as Pearson's Seedling, Barcelona, Du Chilly and Bullnose are among those frequently planted.

The Turkish Tree Hazel (Corylus colurna)

This gigantic member of the hazel family is a native of southeastern Europe and western Asia and extends as far east as the Himalaya mountains. In its native region it grows to a large tree, often attaining a height of seventy feet and a diameter of two feet. The Turkish tree hazel was first introduced into Canada by G. N. Corsan of Toronto. As a result of this introduction healthy trees are now growing at Islington and in Toronto on the campus of the university. Notwithstanding the southern origin of this tree it seems to be quite hardy and is making a good growth.

The Almond (Prunus amygdalus)

A few almond trees have been planted in Ontario in the peach belt and are making a rapid growth and bearing fair crops. There are also several almond trees in good bearing condition in British Columbia.

THE BEECH (Fagus grandifolia)

This beautiful native tree is one of the hardiest nut trees in Canada. It is found in Prince Edward Island, New Brunswick, Nova Scotia, Quebec and Ontario. In Ontario it is said to occur as far north and west as the eastern end of Lake Superior.

THE GINKGO (Ginkgo biloba)

This interesting tree from Eastern Asia has been planted sparingly in several provinces in Canada. There are fine specimens in Montreal, some of which are bearing fruit, and fruiting trees have also been located in Hamilton, St. Catherines and Chatham, Ontario. The pulp surrounding the ginkgo nut or pit has an unpleasant odor and consequently it is not likely to become popular with most people. The striking habit of growth and the peculiar shape of the leaves make this tree a desirable one and therefore it has been rather widely though not abundantly planted.

SUB SOIL CROPS AND THE FOOD SUPPLY FOR TOMORROW'S NATIONS

By Dr. Robert T. Morris, New York

Today one hears a good deal of expression of fear that a populous world may some day run short of its food supply. The idea reminds me of an occasion when two young school friends of mine tramped three miles through the woods to spend a precious Saturday on a bass lake. They forgot to take along their fish hooks but found one old hook and sinker stuck in the side of the fishing basket. The boys pushed off the boat and tossed up a nickel to see who would have the first turn with the hook. Luck fell to George. He baited up with big green grasshoppers and shortly felt a ferocious yank on the hook. It was such a powerful tug that it pulled the end of his rod right under water and broke the line. To add to the aggravation a three-pound bass then came splashing up into the air, open mouthed, shaking the hook in their faces. The day was a failure. Nothing to be done now but sadly walk three miles back home again. The bass jumped once more, this time so near that it hit an oar and bounced over into the boat. When the boys opened its mouth to take out the hook, they found there another hook lost by some previous fisherman. Having two hooks they fished all day and caught a heavy mess to lug home.

That sort of thing is going to happen to our food supply in general, not only for nations now on earth but for other peoples, white, yellow or brown as the case may be, that will naturally follow our present-day civilization tomorrow.

We are prone to think that the present day represents about the last word in everything. A sort of static brainease we may call it. That was the way people felt when the flintlock gun was invented.

Napoleon's surgeon, Baron Larrey, at the height of the second or anatomic era in surgery said that surgery had reached its limitations.

Nothing remained for the young surgeons of the future excepting to acquire what was already known and to perfect their technic. Since then we have had two whole new eras in surgery and the methods of Baron Larrey are as rusty as the flintlock gun which hangs in the museum over the aviator's gas bomb.

The early Christians believed that the world would come to an end within the lifetime of people then living. New England Puritans anticipated that the second coming of Christ would occur at New Haven. All this sort of thing goes to show what we have to face when dealing with a vertebrate animal which named itself Homo sapiens instead of Sophos moros.

Statisticians who tell us that the world is to become over-populated belong in the class with the inventor of the flintlock gun and with Baron Larrey. Almost all of them, however, unfortunately seem to be men of distinction, outstanding from the common run of folks who simply eat and stop thinking when the bill for a dinner and the dinner itself are settled.

Away back in the year 1798 Malthus tried to bolster up Adam Smith and his Wealth of Nations with population deductions of his own. The doctrines of Malthus, however, have never been operative much to the distress of reasoners who still quote him and secretly hope for the time when such forceful thinking at a target will hit the bull's eye.

From the Institute of Politics at Williamstown during the past summer we heard a great deal about over-population. Count Cippico seized convenient opportunity for bringing in a few political arguments in the special interest of Italy. He employed the population fulcrum for his lever. Professor East then applied his birth control lever upon a similar fulcrum and the points of the two short arms coming into conflict with each other caused sparks to fly. Neither Count Cippico nor Professor East dealth with fundamentals. The one was a special pleader in selfish politics, the other a special pleader for a pet statistical theory.

What Count Cippico might have said is this: "Ladies and Gentlemen, I came all of the way here from Italy for the purpose of frankly giving you genuine information. I am in the presence of an audience that is familiar with the law of Von der Goltz. Emigration takes

place in direct ratio with the size of land holdings, increasing as these increase and diminishing as they diminish in size. Because of our system of land tenure in Italy thousands of people from south of Rome must emigrate. Our system of taxation for school purposes is such that we must deny these people an education. I would not for a moment make any trouble for the League of Nations by asking for room for colonies in other countries where a more generous people may educate and feed the scampering hordes which we ourselves could easily feed and educate were we so minded. There is so much unoccupied land in Italy today that wild wolves actually traverse estates of excellent soil which is unemployed agriculturally and untaxed for modern school purposes. What I wish to say is that we might change our land tenure system if our politicians would allow it. They are a spirited lot however and would much prefer to beg first and then fight for what is not given to Italy by other nations. Politicians as non producers do not have to do any personal fighting in case of warfare you know. They simply sacrifice the stock of producers which is at their disposal."

Professor East told Count Cippico that birth control would be just about the right thing for settling Italy's over-population with its political re-percussions. He would halt the entrance of thousands of bright and fresh new minds into the world. It would be his idea to conserve whatever food is now in sight. Never mind about the birth of millions of dear little girls and boys who are to find in their midst plenty of individuals who would grow to teach the rest how to live better than we know how to live today.

Agricultural data comprises the first group of essentials in population studies. A second lot of essentials relates to method and cost of distribution of food supplies. A third lot of essentials relates to the rule that all cultivated plants and animals run out of their fund of protoplasmic energy and breeding comes to a pause. Man as a cultivated animal follows this same biologic law.

Concerning the first group, Java, for example has only about eight tenths of an acre of land per person in its population, yet in Java there are rhinoceri, tigers and deer in abundance. When Dutch capital runs its caterpillar tractors through the rich tropical soil of Java and intensive cultivation of the sort with which Holland is familiar is applied, we may assume that a food supply will burst

forth in such quantity that a man with eight-tenths of an acre of land at his disposal might raise a family of five on that amount of land. The example of Java may stand for tropical jungles in general. There will still be left the land that is traversed by wild animals. This land need not be cultivated very much because sub soil crops will in some cases give a larger food supply than that which is furnished by cultivated land and at much less expenditure in terms of labor and money. Furthermore, sub soil crops do not exhaust the soil as crops of annual plants do.

Now let us carry this abstract statement to a concrete application in Missouri. For purposes of conciseness, let us take only three sub soil crops.

The persimmon tree is a heavy cropper. The fruit of the persimmon stands close to the date in food value. (see U. S. Government Report on the persimmon). Whole tribes of people live upon the date as a chief food supply for men and for domesticated animals. When Missouri takes up the question of cultivating large seedless persimmons and develops methods of preserving them like dates it will mean little expense and little expenditure of labor. The latter remark applies to chestnuts also.

Chestnuts furnish the chief starchy element of food for man and his domesticated animals in parts of Europe and Asia today, taking the place of wheat and the potato. The Chestnut blight has been a severe blow to chestnut orchardists in this country, many of whom were making fortunes; but the blight is by no means insurmountable.

Many of the hybrid chestnuts are highly resistant to the blight and the grafted trees of some of the varieties begin to bear so promptly and so heavily that they yield large returns on the investment. If attention is given to selecting blight resistant varieties and cutting out blight areas of bark as soon as they appear it will mean no more trouble than that which the apple orchardist already assumes as a practical sort of responsibility.

The Black walnut will thrive practically everywhere in the State of Missouri. Cultivated varieties of the Black Walnut may be expected to yield at least ten bushels of hulled nuts to the tree when in full bearing. Given seven Black Walnut trees to the acre and the present market price of $8.00 per bushel for some of the cultivated varieties

we figure out a greater profit at less expense than would belong to any of the common annual crops of the State. The meat of the Black Walnut is rich in proteins and oils and like that of the Persimmon and the Chestnut, contains also vitamins, the fourth essential element in human diet. A pound of Black Walnut meat contains very much more food value than one pound of the best beef. These three sub soil crops in question would be supplemented by many other kinds for the mountain farmer and by the prairie farmer throughout the United States.

Furthermore many annual crops may be raised between the trees if so desired without injury to the tree crops if it is done judiciously; particularly if it is done before the trees come into full bearing while interspaces are still large.

Sub soil farming would relieve us from the feeling of necessity for the draining of marshes. This is commonly done in the interest of promoters and the farmer frequently stands a loss because drained land like irrigated land wears out for precisely the same reason that other land does. The time may always be anticipated when the overhead cost of drainage and irrigation runs afoul of the law of diminishing returns. Excepting in cases where insoluble earthy salts unexpectedly make a hardpan on irrigated lands i. e. the shock of financial loss is apt to come more promptly to owners of drained land for the reason that the soil of marshes carries an unbalanced ration of plant food; too much nitrogen or too much cellulose for example.

The draining of marshes in this country is going on at the moment when similar marshes are being constructed in some of the older countries of the world. Crops from marsh plants, fish, wild fowl and fur bearing animals often bring larger returns than do those from cultivated uplands. Millions of people in the Orient make trapa nuts and lotus their basic food supply. These plants may be grown as well in American marshes.

Concerning the second group of essentials in the over-population question, let us consider the matter of distribution of food supplies. Mathus did not even know about steam transportation. Presumably he did not dream of transportation by air at a time when men could fly from Washington to Panama in less than forty-eight hours.

Just now cattle men are in confliet with our Forestry Service be-

cause they wish to be given special privileges which would have to be taken away from timber men for the purpose. The basic difference between the cattle men's losses and what you and I pay for meat is chiefly a distribution question. Eventually the cattle, sheep and hogs raised under conditions of sub soil crops plus interspace crops of annual plants will take out the long haul cost of meat. This will permit of the making of smaller distribution charges in general and should give us much cheaper meat.

Now for the third group of essentials. The "running out" of cultivated varieties of animals and plants, including cultivated varieties of man, has been exemplified during civilizations of the past. The question is one relating to protoplasm rather than one of primary social significance. We may anticipate the running out of civilized peoples of today in accordance with laws belonging to natural history. It is unfortunate that the birth control argument has been interjected into the over population question. It has genuine values of its own in connection with various stigmata of physical and mental decline which belong to heredity in certain families. It has a bearing also in certain phases of poverty although these will be found to appertain more largely to politics and to systems of land tenure, both of which are remediable. Birth control with the object of conserving food supplies would be particularly disastrous for Japan. This ascendant group of people belonging perhaps to a coming new cultural period for the world needs all of the minds that can be brought forth and developed for application in the collateral sciences of agriculture.

The more people there are in the world the better. The more people the more teachers there will be on the subject of food supplies for the peoples of today and for tomorrow's nations. "The sub soil constitutes a new agricultural frontier for the world."

NUT GROWING IN SOUTHERN INDIANA

By J. F. Wilkinson, Rockport, Indiana

In early days there were thousands of acres of native pecan groves in this section of Indiana. Today there are few large groves left. In early days the pecan nut was not considered valuable. I can remember when I sold nuts at 6 cents a pound, that were sold in 1924-25 at 35 to 40 cents from the same trees.

The majority of the trees are found growing in the river bottoms, in overflow lands. There are many individual trees doing well on clay and sand land. As to latitude, Evansville is about 38 degrees. The pecan is found growing native north to 39 degrees, and a few even at 40. It is found as far north as Davenport, Iowa, but in small numbers. Some of these trees are from 125 to 150 feet high with a circumference measurement up to seventeen feet. As to their bearing records, one tree produced 240 pounds two years ago and for several years paid the taxes on forty acres of land. There are several trees with equal or perhaps better records than that. I have gathered as much as 600 pounds from one tree at one crop. There is one grove of sixteen acres, 35 to 40 seedling trees, from which the owner received $400.00 several years ago and three times in seven years has sold more than the cost of the land. Similar figures might be given from several other groves that yield equally well.

The seedling trees as a rule do not bear as well. Only about 50% of the native seedling trees have good bearing records and a considerable per cent of that 50% does not bear a good quality of nut. There are now in bearing in southern Indiana quite a few of the budded varieties. Interest in budding and grafting the better varieties has been increasing in Indiana for several years but few trees are yet in bearing. One of the first to become interested was H. M. Roper. Twenty-five years ago he became interested in nut culture and gave a few pecan shows at his own expense. Mr. Littlepage before that had planted a lot of seedling nuts. I suppose the first bud

that was cut from any Indiana tree was cut by Mr. Roper eighteen years ago.

It was later that Mr. Littlepage, a few others and I started propagation. We now have quite a few trees anywhere from a few years up to twelve years old, as well as a number of top-worked seedling trees. Some are bearing nicely. The interest in planting nut trees is not as great as it should be in this section. Since it is the native home of the pecan one would think that considerable interest would be taken by everyone. It is not, I am sorry to say.

What we need is more local meetings, county meetings, district meetings. This meeting is good, but it does not reach the local sections.

I have had budded trees start bearing two years from buds. Not transplanted they have borne every year since, with crops from twenty-five to thirty pounds. These were the Busseron and Green River varieties, now 10 years old.

There was no market price for these trees. I was offered 75 cents each but I prefered to give them to my friends. The parent Busseron and Indiana trees are located north of Vincennes, about 38½ degrees. The parent tree of the Niblack variety is south of that.

I wish I had a large pecan orchard. I don't know of anything that is any better. You might call certain sections a native territory but sometimes ten or fifteen miles makes a great difference in the soil and I would consider the soil as much as anything. Every piece of land, even in a native section, is not suitable for a native plant. I would rather plant a pecan tree twenty-five miles north of its parent, on soil adapted to it, than to plant it right in its section on an unfavorable soil. As a rule the pecan tree makes a very deep tap root and it is supposed that it should not be planted near rock. One of the best trees I know of is planted on high land. There is a well under the tree and it is only eight feet to the solid rock. That tree is very prolific.

Member: Would the northern pecan compare in selling price with the southern pecan?

Mr Wilkinson: I don't know about that. None of the northern named varieties are yet on the market.

Mr. Weber: The fine quality of the northern varieties would

surprise you. You could hardly tell the difference between the Green River and some of the southern varieties. You will find a ready sale in your own locality for the good varieties of the northern pecan.

A Member: I have shipped many thousands of pounds of pecans from the northern seedling trees to dealers in the south.

Mr. Wilkinson: I have around four hundred grafted and budded pecan trees from one to ten years old.

There have been numerous articles discouraging the planting of northern pecan trees. I was talking to a man the other day who said that they would not grow north of the Ohio River. The truth is that north of the Ohio River there are many thousands of native trees.

GROWING NUTS IN ILLINOIS FOR PLEASURE AND PROFIT

Dr. A. S. Colby, University of Illinois, Urbana, Illinois

Until very recently nut growing has been a greatly neglected branch of horticulture. An increasing interest is now being shown in the growing of nuts in Illinois. Part of this interest has been aroused by reports of the commercially profitable nut industry in the South where the so-called "paper shell" pecan is grown, or in the extreme West, where extensive orchards of the Persian (English) walnut are found. The quiet but effective work of the late Mr. E. A. Riehl of Alton, George W. Endicott of Villa Ridge, and Benjamin Buckman of Farmingdale in growing chestnuts with profit on a commercial scale is gradually being recognized as valuable evidence in showing the possibilities in this new field of Illinois horticulture. Many are asking whether these nuts can be grown in Illinois either about the home or on a commercial scale as other fruits are grown.

Many native nut trees bearing edible nuts are to be found scattered over the state but comparatively little attention has been paid to them, the general sentiment being that better varieties were available from outside. While this is in some cases true, there is danger in importing species not adapted to our locality. It is, therefore, highly important that an intelligent interest be aroused looking toward the conservation and improvement and profitable culture of our native nut trees as well as the introduction of desirable varieties from other countries.

In order to study the whole situation with reference to the needs and possibilities of nut growing in Illinois, a general survey of the occurrence and distribution of native and introduced nut trees in this state is being made by the writer. Considerable valuable information has been very kindly furnished regarding the nut trees native to the state by Mr. R. B. Miller, State Forester, from his extensive records. Dr. L. H. Smith and assistants in the Soil Survey work in the College

of Agriculture at the Experiment Station have been very helpful in listing the numerous genera and species of nut trees as they have located them in checking up on the flora in making up soil maps of the different counties. Colleagues in the Department of Horticulture have also added to our list of nut trees as they have observed them. An extensive correspondence among the members of the Northern Nut Growers' Association, county farm advisers, and others interested in nut growing in the state has been of assistance.

It is hoped that we will be able to prepare a detailed county map of the state showing (1) the native range of the most important nut bearing trees, and (2) the most important areas where such trees are being successfully grown outside their natural range because of local conditions favorable for growth and fruiting. We are also attempting to gather figures as to the commercial possibilities of nut culture in Illinois. Much of this information is in progress of tabulation and no definite conclusions can be drawn as yet in answer to all questions being asked.

A number of interesting facts have, however, been gathered and are here submitted in the nature of a progress report.

Nut bearing trees native to Illinois include the shell bark hickory Hicoria laciniosa (C. laciniosa Cy), the shagbark hickory, H. ovata, (C. ovata Cy), the mockernut, H. alba, (C. alba Cy), the bitternut, H. cordiformis, (C. cordiformis Cy), the pecan, H. pecan, (C. pecan Cy), the American sweet chestnut, Castanea dentata, the black walnut, Juglans nigra, the butternut or white walnut, J. cinerea, and the beech, Fagus americana (F. grandifolia Cy-Ag.)

Smaller trees or large shrub-like forms include the Chinquapin chestnut, C. pumila, and the American hazelnut, Corylus americana.

A number of hickory and black walnut species hybridize rather freely. There are some excellent natural hybrid varieties in the trade showing indications of the pecan-shell bark hickory and the shag bark-bitternut crosses.

Nut bearing trees not native to Illinois but varieties which are promising for planting in different sections include the European filbert, C. avellana, the Japanese walnut, J. sieboldiana, the Chinese walnut, J. cathayensis and the Japanese heart nut or flat nut, J. cordiformis.

(1) Standardized Plant Names—1923—American Joint Committee on Horticultural Nomenclature—Salem, Massachusetts, is here used as authority.

(2) The pignut (C. glabra Cy. C. porcina) is not included in the above list since (1) it is not commonly edible, and (2) it is probable that the true pignut is not found west of the Alleghenies, although this is one of the hickory species which has been much split up by systematic botanists.

Nut bearing trees not considered desirable for general planting in this state include the English (Persian) walnut, J. regia and horticultural varieties of the so-called "paper shell" southern pecan. The former is not as hardy in wood or bud as the black walnut and is often killed back to the ground. The writer has seen specimen trees in central and southern Illinois which were making fair growth but not fruiting. This so-called winter injury is probably due as much to the unfavorable climatic conditions found in Illinois during late summer and fall as to low winter temperatures. It appears that the roots needs considerable moisture during the fall months.

The southern varieties of the pecan are often winter killed at the tips. In favorable seasons they will grow vigorously but seldom mature any nuts. Trees growing in Pulaski County, in extreme southern Illinois, bear occasional nuts but they are not well filled out and do not ripen.

General Considerations

It is not generally known that nut varieties do not come true to type from seed any more than do apples. Like other fruit trees, therefore, nut trees have to be propagated by budding or grafting. Seedling trees, only, will result from the planting of nuts no matter how desirable the nuts may be. Such trees will very seldom produce nuts as good as the parent and will, if they bear at all, be very slow in beginning. Because of this fact it is desirable to plant named varieties, propagated by reputable nurserymen, or to work over seedling trees using scions or buds of a named variety. There are many opportunities for top working seedling walnuts, chestnuts, pecans and hickories now growing on hill sides, along fence rows, etc.

The demand for named varieties of nuts is comparatively recent, and few nurserymen have devoted much attention to the propagation

of such varieties. Many nurseries show photographs of superior nut varieties in their catalogues but list for sale practically nothing but seedlings. This is unfortunate in that it is disappointing and expensive for the purchaser to buy trees and care for them with the mistaken idea that he is getting good varieties.

Nut varieties worthy of general propagation and distribution must have certain valuable qualities. First of all the parent tree should be healthy and vigorous with no inherent fault as to its growth habit. The ideal tree is a regular bearer and at least moderately productive. The nuts should ripen early and be of good size, with a fair proportion of meat to the amount of shell. The shell should be fairly thin and easy to crack. They should be quite resistant to the attack of insects and diseases. Some chestnut hybrids in southern Illinois, for example, are more resistant to the chestnut weevil than others growing close beside them. The nut meats should be plump, of good color, rich flavor and high quality.

Nut trees are more difficult to propagate than some other fruit trees, and their first cost therefore appears somewhat high. They should be planted at considerable distances apart, however. For example, chestnut trees are planted forty feet apart and black walnuts at least double that distance. The initial expense involved will then be less than in planting an area to other fruit trees. Some growers believe that other fruit trees may be used as fillers for a few years or until the nut trees begin to bear. This helps to pay running expenses during that period.

It has been said that the low market prices paid for our native nuts as collected in the woods and for sale in limited quantities in the fall at the corner grocery does not promise well for their commercial possibilities. These native walnuts, hickories, pecans and hazels are from seedling trees and for the most part poor in cracking and eating quality and comparatively small in size. There is an enlarging market at good prices for the named varieties of nuts.

Description and General Distribution of Nut Trees in Illinois

The Black Walnut

The chief native nut tree of Illinois and the one to be most recommended for general planting is the black walnut. It is found growing

wild throughout the length and breadth of the state where soil conditions are suitable. This species is adapted to a deep, moist but well drained soil such as is usually found in the so-called prairie types in Illinois. The soil must be rich for best results as the walnut is a very heavy feeder.

Its chief commercial importance has, in the past, resulted from the excellent qualities of the wood. This was used for many purposes ranging from fence rails to the finest cabinet work. Many trees have been cut for the lumber which should have been left to bear nuts.

Quite recently improved horticultural varieties of the black walnut such as the Thomas and Stabler have been found and are being propagated and sold for general planting. Considerable interest has been taken in the commercial possibilities of the black walnut especially in southern Illinois. The late Mr. E. A. Riehl of Alton, the best informed man in the state on the growing of nuts, told the writer in 1925 that he cracked out ten pounds of meats to the bushel of Thomas black walnuts and could not supply the demand of the trade at a sale price of one dollar a pound. Commercial cracking machinery just placed on the market cracks the meats much more easily and cheaply than it was formerly done by hand.

The named varieties sell for higher prices because of their easier cracking quality, larger size and better flavor. The kernels of the black walnut are the most desirable for many purposes especially in cooking and candy making. The black walnut is the only nut meat which retains its full flavor upon cooking. The meat is more palatable and lighter in color if the nuts are allowed to cure properly and the husk is removed from the shell before it stains the meat a dark color. With the possibilities of increased consumption of nuts as food practically unlimited, there is a bright future for the black walnut industry in this state.

A number of interested fruit growers in Union and Pulaski Counties are top working seedling walnut trees, growing on hillsides, in pasture land or other out of the way places, to desirable varieties. They use a modified bark graft as a rule. It is usually safer to cut back the tree a few days before it is to be top worked and then to protect the young scion for a few weeks after grafting by covering it with a paper bag. The vigorously growing scion should be supported the first season by tying it to a lath which has been fastened to the stock.

Black walnuts begin to bear early. The writer saw in October, 1924, in Williamson County, a grafted tree of the Thomas variety at four years of age, bearing thirty-nine nuts. The species is well known as a long lived tree and properly cared for it should increase in productivity annually for many years.

The Butternut or White Walnut

This species is found in all parts of the state though not as commonly as the black walnut. It will grow on a variety of soils but succeeds best when planted on a rich, well drained, gravelly loam. It has been found locally in ravines and along streams where the soil is loose. Compact soils are not favorable for its growth.

The tree is much smaller in size than the black walnut, not as healthy or vigorous and varying greatly in productiveness. The nut has somewhat the same qualities as the black walnut with a rough, thick shell, rather more difficult to crack. Some people like the flavor of the meat better than that of the black. Promising varieties originating in the East such as the Manchester should be tried out under our conditions. The Buckley variety from Iowa is one of the best.

Japanese Walnuts Including the Heartnut

The Japanese walnuts have been introduced into various sections of the state, especially through the central and southern counties. The tree is characterized by a rapid growth, beauty of form and foliage, and early bearing. It is claimed to be hardier than the black walnut. The heart nut is highly recommended by Mr. C. A. Reed, Nut Culturist for the United States Department of Agriculture, as a promising sort for Illinois. The nuts are medium sized, distinctly heart shaped, with a thin shell and a kernel of good quality. They crack easily with one tap of the hammer and the kernel easily comes away from the shell. The Lancaster is considered one of the best varieties.

The second type of Japanese walnut, J. sieboldiana, is a smooth shelled sort resembling the butternut in shape. It is superior in some respects to the butternut but has not as yet shown sufficient promise for general planting, although it has been fruited by Mr. Riehl at Alton.

The Chinese Walnut

This nut is being grown experimentally in the eastern and northern

states. It may prove hardier than the Persian (English) walnut and take its place as a commercial sort for this state. The nut is said to be very large with a shell somewhat midway in thickness between the English and black walnut. The kernel is reported to have a fine flavor. We are attempting its culture in the state. The writer has a number of seedlings growing from seed imported from China.

The American Sweet Chestnut

The chestnut is native to the state, being found in Olmstead, in Pulaski County as reported by Trelease (1). It is reported from other counties, mostly in central Illinois, though it is probable that there are no other native stands of this species. It succeeds best on a well drained soil on sunny ridges, even in rather dry and rocky situations. It will not grow in wet soil or in soil underlain with hard pan. Limestone soils are not desirable. Chestnut trees, blue grass and sheep make an excellent agricultural combination, on rough hilly land too steep for ordinary cropping practices.

The tree grows rapidly to a large size and comes into productive bearing early. In the fall of 1924 Mr. Riehl showed me a young chestnut tree of the Fuller variety, five years from the graft, which was then producing thirty-one burrs, three nuts to the burr. Chestnut trees in southern Illinois at the Endicott homestead near Villa Ridge were coming into profitable bearing at six years of age. Mr. R. B. Endicott told me in 1917 that his three largest trees of the Boone,

(1) Trelease, Wm., Trans. Ill. Acad. Sci., 10:1917, 143-145

Blair, and Riehl varieties had made an average for the last four years of better than one hundred pounds of nuts per tree. They were then eighteen years old. In the fall of 1924 Mr. Endicott told me that he was harvesting about 160 pounds from each of these trees. At the wholesale price of thirty-five cents per pound, on the Chicago market, his gross profits were over fifty-five dollars ($55.00) per tree annually. The chestnut blossoms late in spring and is seldom caught by a late frost. Mr. Endicott's trees have failed to bear a crop but one year since planted.

The varieties mentioned are hybrids between the Japanese and native species. The Fuller variety, another hybrid, originated and first propagated by Mr. Riehl, is superior to these in the quality of its nut. It is a few days later in ripening, however.

The only objection to the more general planting of these improved varieties of chestnuts in Illinois is that they may be at some future time infected with the chestnut bark disease which is fatal to the trees. As far as we know, however, this disease is not present in the sections just east of us and there are very wide barriers to its western migration. There is no reason for importing nursery stock from the East which may be already infected, since the Boone and Fuller are equal to any varieties being grown outside the state.

The Chinquapin Chestnut

This species grows locally, especially in southern Illinois, under similar conditions to the native sweet. Usually of shrubby bushlike growth, it has some advantage over a larger tree in ease of propagation. It bears a smaller nut than the native sweet but it comes into bearing very early and the nuts are of excellent quality. It makes an ornamental little tree and pleases the children to have one for their own.

The Pecan Hickory

In the minds of many people, the pecan is placed first from the point of view of the quality of the nuts produced. Native to Illinois, the pecan is found growing abundantly all over the state where conditions are favorable. It is quite generally restricted to bottom lands, especially over southern and southeastern Illinois, along the Kaskaskia and Ohio Rivers and their tributaries. Other productive stands are found along the Illinois River at least as far north as Peoria County and along the Mississippi through Jo Daviess County. It is most common on bottom land subject to overflow at the time of the spring floods. This fact may partially explain the general distribution of the pecan through the dispersal of the nuts by flood waters. It has been found, however, that pecans will grow well on higher land. Since the pecan has a long tap root, soils underlain with rock or hard pan, which comes near the surface, must be avoided in planting.

In Illinois, varieties only of northern or local origin should be considered for planting or top working on seedling trees. None of the so-called "paper shell" or southern pecans are sufficiently hardy to recommend them. Mr. S. W. Snyder of Center Point, Iowa, a recognized authority on the propagation and care of nuts, writes me that "nature planted pecans in Iowa up to the forty-first degree of latitude." Such varieties native to Iowa include Witte, Campbell, and

Oberman. Mr. Snyder further writes that " these varieties while not so large as those found growing farther south, yet are large enough to be desirable and when it comes to quality, freshness of cracking and thin shells they cannot be surpassed by any." Mr. Riehl believed that pecans will not be hardy and productive in Illinois as a commercial proposition north of the thirty-ninth degree. Alton, Mr. Riehl's home, is just south of this line.

It is true that north of Alton in Calhoun County, native pecans are common, grow vigorously, and bear well some years. The late frost last spring cut down the crop materially. This often happens in that section. However, many excellent varieties originating in southern Indiana can be planted with fair promise of success in southern Illinois, south of the thirty-ninth degree of latitude. These include the Niblack, Busseron and Posey. While not as large as the southern types, these varieties have a fairly thin shell of excellent cracking quality, with plump kernels of rich flavor. The Posey is said to be the easiest of the three to crack and is of good size. It has the reputation, however, of being a shy bearer.

The Shagbark Hickory

This species is the most valuable of the hickories for Illinois planting excepting the pecan. It is found well distributed over the state, sometimes on low lying sandy loams along the river bottoms. It is also found commonly on the rolling uplands, especially on the sides of the hills, associated there with the shellbark. The soil type common there is known as yellow gray silt loam on undulating timber soil. The shagbark is very promising for selection and improvement. The nut varies greatly in size and shape and cracking quality. Some strains have exceptionally thin shells, and crack easily. The varieties Hales and Vest are highly recommended.

The Shellbark Hickory

Sometimes called the big shell bark or King Nut, this species is found native over the state, at least as far north as Peoria County. It more often prefers the low lying river and creek bottoms and like the pecan does not suffer from an occasional overflow if not too long continued. The tree and nut are both larger than the shagbark. The nut is thicker shelled and the kernel, though good in quality, is not so much sought after as the shagbark. The Weiker variety is probably

a cross between the shagbark and the shell bark and is a promising one.

The Mockernut and Bitternut

These two hickories are found growing quite generally over the state. They appear to adapt themselves to their environment, growing both in the low lands and upland or prairie types of soil. The nuts are medium in size and of little value for human food.

The bitternut is chiefly valuable as a parent in hybridizing with the shagbark hickory.

The pure shagbark, while it bears nuts of fine flavor, is of such slow growth that it is recommended by J. F. Jones of Lancaster, Pennsylvania (one of the best known nut nurserymen) to plant hybrid varieties from the shagbark-bitternut cross. He says that these hybrids are rapid growers and bear excellent crops in six years from grafts. These nuts inherit their thin shell and thick meat from the bitternut parent with the good quality of the shagbark. Mr. Jones recommends the Beaver variety from Pennsylvania, the Fairbanks from Iowa and the Laney from New York.

The American Beech

This beautiful tree is found widely distributed, often being found on the prairie as well as in the dry sandy regions. It is a common tree on high ground, although it is sometimes found at much lower levels. It has not been commonly thought of as a nut bearing tree, since it is of slow growth and does not bear early or regularly. Although the nuts are of excellent quality, they are too small for general use. It is possible that they may be improved. It is understood that the tree does not take kindly to domestication and special pains are necessary in transplanting.

The American Hazel

This species grows wild throughout the state. A moderately rich, well drained soil and favorable climatic conditions such as freedom from mild periods in winter and no late frosts in spring are requirements for the successful culture of the hazel. Both staminate and pistillate catkins develop in fall and are ready to open with the approach of mild weather in winter or early spring. The planting of different varieties to provide cross pollination is essential. No de-

sirable named varieties have been originated from the native species worth propagating except possibly the Rush. From the European species, however, as well as from hybrids of the American and European species, a number of excellent varieties have been secured showing promise for commercial culture in Illinois. Judge Potter of Marion is growing the Dorrton of French origin, as well as other varieties successfully. Other varieties worth trying out are the Barcelona, Daviana, Du Chilly and Globe.

Where Nut Trees May Be Used To Advantage

Nut trees of suitable species and varieties should be more generally planted in Illinois. They can be made a source of both pleasure and profit.

(1) Trees for the Home Grounds: There are various places about the home both in the city and country where shade trees might be both useful and ornamental. Why should we not start now increasing our potential food supply? The future will show its need.

(2) As Roadside, Street and Park Trees: Little attention has been paid to the wonderful possibilities for using nut trees where the soil and site are suitable, for beautifying our roadsides, streets, and parks with various hardy species, both the best varieties of the native as well as the introduced species. In Michigan nut trees are being planted along the highways. We should do this in Illinois.

(3) On Otherwise Waste Land: There are many areas, especially in southern and western Illinois which are not easily or profitably cultivated. Where the soil is suitable, it is highly desirable that chestnuts, black walnuts, hickories and other species be planted there. Soil erosion is a serious factor in limiting the planting of agricultural crops in southern Illinois. Nut trees on rolling ground often effectively prevent soil erosion and bring in highly profitable returns. Reforestration with nut trees bearing edible nuts is highly commendable. The trees may be used primarily for their timber while the nuts will be worth considering as a side issue.

(4) As a Commercial Proposition: Chestnut orchards in Villa Ridge cultivated like fruit trees or in Alton on steep hillsides, have already proven a commercial success. Walnuts and pecans especially in southern Illinois should be tried out. Figures have already been

given showing the yields and prices obtained from these chestnut trees at Villa Ridge. Mr. Robert Endicott has one chestnut orchard of seedlings near the older trees above mentioned which he cultivates like other fruit trees and finds it a profitable use for southern Illinois land. Mr. Riehl had over 2000 chestnuts in bearing, some in orchard form. Mr. Riehl has often stated: "Make all reasonable allowances; the fact remains that chestnut growing in favorable locations is a very promising horticultural proposition."

J. F. Wilkinson of Rockport, Indiana, a nurseryman of considerable experience in propagating nut trees, believes that orchards of nut trees interplanted with apples and other fruits will be profitable and more permanent than where no nut trees are used. Experimental evidence in Illinois is not as yet available and will be necessary before recommendations can be made. It has been shown in Virginia where apple trees fifty feet from a black walnut were killed, that there was intimate contact between the roots of the walnut and the dead apple trees. It would, however, be possible to secure several crops of apples before such a condition would become serious.

At Marion are the beginnings of a commercial planting of pecans, chestnuts, and black walnuts, owned by Judge W. O. Potter.

There are many questions involved in nut growing in Illinois. Many make mistakes in planting nut trees too closely. They do not realize that the trees are extremely long lived and will need considerable room 75 years hence.

The greatest care is necessary in transplanting. Many reports have come to me of loss of trees at this time. Not only should the tree be planted carefully but the top must be severely pruned, much more severely than is the case with apples or other fruit trees. Special care the first season is necessary or the roots will dry out. Mulching is absolutely necessary.

Some growers are recommending planting the seeds of walnuts and chestnuts in place, then top working the seedlings.

Better pruning methods must be worked out. Some varieties of black walnut such as Stabler, need special care to preserve a central leader. Keep the head from the ground by under cutting.

The common insects and diseases must be watched for and killed at once. Defoliation of a young tree is a serious set-back to its future growth and early fruiting.

THE PECAN INDUSTRY IN THE SOUTH

J. M. Patterson, President National Pecan Growers Association, Putney, Ga.

I want to bring to this convention the greetings of the members of the National Pecan Growers Association, and to extend to you a very earnest invitation to attend our next annual meeting. We have in our association about seven hundred members and we usually have an attendance of between three and four hundred.

Pecan growing has passed beyond the hope and faith stage and become an established industry. In the state of Georgia we have something like 70,000 acres planted to budded and grafted pecans. A very large part of this acreage has not reached production. I believe there is nearly as large an acreage as the walnut growers have in California and, if the pecans produce anything like the walnuts in California, in the course of ten or twelve years we should have a production equal to the walnuts in California and, because the pecan is a much better nut, we should have a bigger return.

The pecan has had its ups and downs. The first commercial orchards were planted about eighteen years ago. I think the firm with which I was identified was one of the first to plant in a commercial way. I think the oldest orchards, which are only small ones, are down the Mississippi. They are probably thirty-eight or forty years old. In southwest Georgia there are some which are twenty-two or twenty-three years old. The majority of the orchards are from eighteen years old down to infants, so the industry is today still in its infancy. There used to be talk, when pecans were first planted, that the tree was without disease or insect enemies. We have recovered from that statement. The disease we suffer most from is the scab. The Delmas variety, which is the largest variety of good quality produced, is said to be abandoned practically everywhere, the trees cut back and worked over to other varieties. In some sections the Schley is also suffering

from the scab and has been top worked to other varieties that are apparently immune. Apparently the pecan is affected by scab differently in different locations. Our experience with spraying for the scab has not been satisfactory. I drove by an orchard where the Department of Agriculture was conducting an experiment and the trees were all defoliated by Bordeaux. We cannot afford commercially to spray five or six times. If we find any variety that we have to spray five or six times in a year we might just as well work it over to some variety that we do not have to spray. With the very best spray rig obtainable it is impossible to spray more than eight or ten acres a day. When you have one hundred thousand acres to take care of, it is an impossible task.

We made an experiment on our groves this year with an aeroplane, dusting. It will do it all right. It puts it on and distributes it well. I believe an aeroplane could dust a thousand acres of pecans in a day. They dust a thousand acres of cotton in a day by aeroplane. When the chemists find a dust that will be effective in the control of pecan scab, or any other of its diseases, they will have made a wonderful contribution to the pecan industry. I believe it is practical to use an aeroplane to dust the pecan with and at no prohibitive expense.

Another thing we have to contend with is an insect pest known as the nut case borer. We have had a very heavy infestation with this in northern Florida and southern Alabama. They started in northern Florida about ten years ago. We are about seventy miles north of Monticello, Florida, and it did not reach us until about seven years ago. Last year we suffered a stunning blow from the nut case borer. The insect bores right into the little nut when about the size of a pea and it is hard to reach him with poison. There is one fortunate condition however. We sometimes hear the slang expression "Ain't nature wonderful?" But I have used that expression this year in a most serious way because when the nut case borer began to make his attack on our crop the natural enemies were right on his trail and wiped him out. I don't believe the nut case borer did more than 10% damage in our orchard this year, whereas they did 100% last year. I understand that when the nut case borer is gone and the parasite dies out, the nut case borer comes up again.

We have never been able to produce enough of the paper shell pecan to supply the demand. I think Mr. Hess and his associates

have made quite a contribution in this book which he has gotten out. It is something that will unquestionably, if it can be put into the hands of the housewives, increase the domestic use of pecans. I think the pecan industry is very greatly indebted to Mr. Hess and his associates for the work they have done.

Mr. Anderson: Do you know how far north the scab has reached?

Mr. Patterson: I know it has reached north in Georgia as far as Macon, about one hundred miles south of the northern line.

A Member: It is worse in a wet season than a dry?

Mr. Patterson: Yes sir.

A Member: Do you know the name of the parasite that has brought your nut borers under control?

Mr. Patterson: No sir. Those who are down there working on it told me there were eight that they have discovered.

A Member: It just occurred to me that we have before us a most successful nut grower from a section which has arrived. He is talking to us who are representatives from a section which hopes to arrive. I would like to ask if Mr. Patterson would recommend that those interested in the subject in the northern states should start the planting of nut orchards on good land, to see how they will behave, in the interest of progress?

Mr. Patterson: If you don't go out and plant something you will always be where you are today. Make a little experiment. Take the best soil you can get and give it the best care. I have never seen any pecan trees succeed that were just left to grow up. My experience with pecan trees is that they are most responsive to good care. A good many people thought in the south a good many years ago that they could take land that would not raise cotton and raise pecans on it. But that would not do. The best soil we can get is none too good. I have one plantation that I paid twice as much for as for any other land. That extra fine soil is the best investment I ever made in laying the foundation for a pecan orchard. A good many people make the mistake of selecting indifferent soil and giving indifferent care. If a man is not going to put the best of soil under his orchard and give it the best of care, he should not plant anything. I would rather have

ten acres on good soil and give it the best of care, than to have five hundred on indifferent soil with indifferent care.

The results from pecan growing have been disappointing to some. When we started planting orchards eighteen years ago we did not know much about it. All we knew was what a man here and there told us. But he had not kept accurate records. My experience has been that I have not had any orchard that has paid commercially under ten years. However, if I were planting an orchard today, I would use those varieties that produce early crops, I mean in five or six or seven years, and heavy crops, heavier than any of the old standard varieties that were planted seventeen or eighteen years ago. It is not the highest grade pecan that pays the best. It is the cheaper grades that have been the most profitable. And I think that in place of sticking to the higher grade of pecans, like the Schley and Pabst we are going to plant more of the varieties that bear younger, even though the nuts are not so large, such as Moneymaker and Success and Moore and Waukegan, and even though the quality is not so good. I have some trees budded three years ago with the Moore variety whose tops are breaking. I would plant a considerable percentage with these varieties that are early and heavy bearers. There is a great demand for a medium price nut. The chain stores say they cannot handle a nut that costs more than 30c. We cannot afford to sell the Stuart, or any variety like that, for 30c but if we had these cheap varieties we could afford to sell thousands of pounds at that price.

THE FIRST YEAR AT THE KEYSTONE PECAN RESEARCH LABORATORY

Elam G. Hess, President, Manheim, Pa.

When we talk about nuts as a staple food we are not talking about some new fad or some untried experiment. The use of nuts as a staple food dates back to the beginnings of the human race. "All scientific men are now agreed that nuts were the chief staple in the diet of primitive man," says Dr. J. H. Kellogg.

Our investigations concerning the use of one of our most common nuts takes us back to that nut which takes it name from the Gauls—the WALNUT. This word is a corruption of the name GAULNUT, applied by the people of England when this nut was brought over from France. The walnut was used in middle Europe as a staple food long before the era of Julius Caesar. Whether the walnut had been introduced into Rome before this time we are not sure. But we do know that practically half a century later it was a popular food in Rome, and was called the Royal Nut.

Charles Darwin speaks of baboons opening nuts by breaking them with stones. Prehistoric man may or may not have been a descendent of that type of baboons, but Professor Eliot, one of our most eminent authorities on the habits of primitive man, says that primitive man found his meat supply in the nuts borne by the forests of nut trees which covered the earth in those days of the beginning of the human race.

Can milk, eggs, and the other food staples of today show similar history? Worthington Smith, in his book entitled "Man the Primeval Savage," writes: "He had for food hazel-nuts, beech-nuts, sweet chestnuts, earth-nuts, and acorns." Wells, in his Outline of History, fixes the time when milk came into use as a food as thousands of years later during the neolithic period when grain was first cultivated in middle

Europe, and an unleavened bread was also made. There are many writers who fix the first use of milk later, when mankind became nomadic, and Wells himself says, "Milk is not a natural food for

[Note: On account of lack of space it has been necessary to abstract the paper of Mr. Hess.]

adults; it must have seemed queer stuff to take at first and it may have been only after much breeding that a continuous supply of milk was secured from cows and goats."

The use of hens' eggs and the cultivation of poultry seem to be quite recent, according to Wells. He assumes that up to 1500 B. C., the only fowls in the world were the jungle fowls of Burmah and India. It is probable that fowls were first domesticated there, he states. It was 400 years later before the Chinese people had them and still later before they reached Greece by way of Persia. Wells calls attention to the fact that among the very few mentions of eggs which appear in the Old Testament, only one, Job. Chapter VI, 6th verse, seems possibly to refer to the eating of hen's eggs. The question of Job, in this verse, "Is there any taste in the white of an egg?" may not necessarily refer to the egg of the hen, even though it is simultaneous with the first mentions of jungle fowls in India and Burmah, a great distance away in those days.

If then Professor Elliot is right in his conclusion that primitive man was not a flesh eater; if Professor Ami, of Montreal, is right in his statement that study of paleontology proves that man did not become a flesh eater till after the glacial period; then nuts remain as the only known staple source of fat and protein which were used by primitive man. Milk, eggs, and animal flesh, instead of being the primary staple foods that the average man considers them, are the new food fads of the race, when compared to *nuts,—man's staple foods from the beginning.*

All through the history of the nations of the world we find the nut tree valued for its yield of food. Look for a moment in your Bible. Turning to the laws laid down for the people of God we find in Deuteronomy, Chapter 20, Verses 19 and 20, that even when besieging a city they were not to cut down for war purposes the trees bearing food. "For *the tree of the field is man's life,*" says the 19th verse, while the 20th verse permits the destruction and use of the trees

that *"be not for meat."* Genesis 43:11 shows what Israel considered the greatest offering he could make. "If it must be so now, do this; take of the best fruits of the land in your vessels, and carry down to the man a present, a little balm, and a little honey, spices and myrrh, *nuts and almonds."* In the Song of Solomon, Chapter 6, Verse 11, we find, "I went down into the garden of nuts to see the fruits of the valley."

What were the nuts of the Bible, which were held in such high esteem? Notably the almond which is mentioned most often by name, the chestnut, the walnut, called Egoz in Hebrew, or Royal Nut, the hazel nut, and the pistachio.

Read the seventeenth chapter of Numbers and note in the eighth verse, "And behold the rod of Aaron for the house of Levi was budded and brought forth buds and bloomed blossoms and yielded almonds."

You will notice in Isaiah 6, Verse 13, a reference which places similar value on the pistachio nut. For it is likened to "the holy seed," meaning that small remnant of the Jewish people who shall be saved from destructions and on whom the whole future of the nation depends. Back in the 30th Chapter of Genesis you find mention of Jacob before his departure from Laban, taking rods of the hazel nut and of the chestnut tree and of the miraculous results ascribed to them. This significance of the nut tree as the source of food runs through the Old Testament from the very first chapter of the first book. In Genesis I, Verse 29, we read, "And God said, 'Behold I have given you every herb bearing seed which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed; to you it shall be for meat'."

What is the record during the past two thousand years? Let us look into the facts regarding the notable trees of the world, trees which are famous the world over. None is more famous than that wonderful chestnut tree on Mount Etna which the natives call "Castagna di Centa Cavalla". Its name indicates that a hundred horsemen can be concealed within its hollow trunk, the circumference of which measures one hundred and eighty feet. This tree is one of a vast chestnut grove on Mount Etna containing other trees of prodigious size and of great age many of which are still bearing.

Michaux describes the Grand Chestnut near Saucerre, France,

which measures thirty feet in circumference at six feet from the ground. Six hundred years ago it bore that famous name and, although it is over a thousand years old, its trunk is still sound, and its branches still laden annually with nuts of fine quality.

In the Baider Valley, near Balaklava—the point made famous by the Charge of the Light Brigade—stands a famous walnut tree with even a longer record. This grand old tree over 1200 years of age is yielding annually crops of over one hundred thousand nuts, being divided among the five Tartar families which have owned it.

During the siege of Amiens by the Spanish in the sixteenth century, determined to accomplish by a ruse what they could not accomplish with their cannon, they caused a party of men, dressed as French peasants, to bring a cart-load of nuts to the city for sale. When admitted to the city gates the make-believe French peasants let some of the walnuts fall from their cart. The sentries could not resist the temptation to gather them and as they deserted their posts and stopped to gather the nuts they were set upon by the disguised peasants who took the gates of the city and admitted the Spanish army.

If the written records from China and Japan were as readily available as those from Europe, we would find much of value regarding the antiquity of nut trees there. Mr. Reed could, from his personal investigations in China, tell you much along that line. The great age of their nut trees and their records of production for generations would make a most interesting subject for a talk by him to your organization.

In America we are limited to the period since Columbus landed if we restrict ourselves to the record written by man. But Nature has written her own record in enduring stone. In Lampasas County, Texas, fossil remains of pecan trees have been found which date back to the lower cretaceous period, which shows that America had this nut tree as a source of food for her inhabitants many thousands of years ago. In the San Saba Valley a perfect fossil of the pecan nut which had been 30 feet below the surface was thrown out by a blast from a well.

It is certain that the earliest explorers found the pecan largely used by the native Indians. Sturtevant tells us that " the pecan was eaten by the Indians and was called by them Peeaunes, and an oil ex-

tracted from it was used by the natives of Louisiana to season their food." Its use at or near Madrid on the Mississippi by the Indians is mentioned in the Portugese Relation of De Soto's Expedition. Bancroft refers to the fact that DeSota discovered not only the Mississippi River but also the pecan, and fixes the date of this discovery of the pecan in 1541. On page 47 of Volume I of Bancroft's History of the United States, the pecan nut, the mulberry and two kinds of wild plums are mentioned as furnishing the natives with articles of food.

The Indians had a liquid obtained by pounding the kernels of the nuts and throwing them into boiling water. This liquid, called powcohicora, was used to thicken venison broth, to season hominy or corn cakes and, according to the records of the American Philological Society in 1872, was in some instances allowed to ferment, forming an intoxicating drink.

About 150 years later, when the French had more largely settled this district, numerous references to the pecan nut appear. We see that these early French settlers had learned from the Indian to place their dependence for food largely upon the pecans. Jean Penicaut, in his Annals of Louisiana covering the period from 1694 to 1722, makes references to the food value of the pecan both to the Indian and to the early settlers. Describing Natchez, an Indian village on the Mississippi, he says, "The natives have three kinds of walnut trees, some whose nuts are as big as the fist, from which bread for their soup is made. The best ones, however, are scarcely bigger than the thumb and are called Pacane." Xavier Charlevoix, French missionary and traveller, descended the Mississippi to New Orleans in 1722 and published a history of new France in 1744. In this he gives a good description of the pecan as he had seen it, after comparing it with the acorn in length and general form. After describing the fact that some have very thin shells, and showing their advantage to those with the harder, thicker shell, which were even smaller, he says, "All have a very fine and delicate taste."

Le Page du Pratz, a French explorer, visited New Orleans in 1720, and spent eight years exploring the Mississippi Valley. In 1758 he published a history of Louisiana in which he describes the pecan accurately and particularly praises its flavor. In it we find the first mention of the pecan praline which the French colonists made out of the kernels. What other candy, originating in America, can point

to an unbroken record of 175 years of popularity in the districts where it was known? The high esteem in which the pecan nut was held wherever it was known, is indicated by the fact that after peace had been declared between the French and Indians and the American colonists, it was but a very short time before pecans were known in New York City, to which they were brought by fur traders from the Mississippi Valley. Preceding the American Declaration of Independence young pecan trees had gone through New York to England where they were sold for ten guineas each.

We have no exact record as to when Thomas Jefferson first learned of the pecan and was converted to its use. We do know that he esteemed it highly, as is shown by his description of the pecan tree in his notes from Virginia, published in 1784. We do know, also, that it was from Jefferson that Washington received the pecan nuts which he planted with his own hand around Mt. Vernon on March 25, 1775. Charles Sprague Sargent, Director of the famous Arnold Arboretum at Boston, who has suggested the recent plantings around the Washington home at Mt. Vernon, and has catalogued and investigated the history of all the old trees on the property, calls attention to the fact that these three pecan trees which still stand to the southeast and east of the mansion, are the oldest known trees on the property planted by Washington. He shows the height of these trees to be respectively 97, 98 and 86 feet, placing them among the giant trees on the property and says, despite the fact that they are 150 years old, "The three pecan trees are in good condition and, unless blown over or injured by gales, probably have not lived out half their lives." Whether Washington was an ardent disciple of pecans as food prior to the planting of these trees we do not know, but we do know that de Courset, brother of the famous French botanist, served with Washington and left the record that "the celebrated general always had his pockets full of these nuts and he was constantly eating them."

Every now and then some feature writer discovers that acorns are largely used as food and have been largely used in the past, and builds upon that fact a story appealing to the general public in which he tells how the Indians of the Pacific Coast region used acorns in large quantities and how, in some cases, this use persists despite the necessity for a long and troublesome treatment. He refers to the acorn meal of Italy and other sections of Europe which is used in making

bread, and comments upon the use of dried acorns as a substitute for coffee.

Burbank comments upon the great economic importance of nuts among the older nations of the world. He refers to the fact that in Korea the chestnut takes the place in the dietary not unlike that which the potato occupies with us, being used raw, boiled, roasted or cooked. He calls attention to the large use of chestnuts in France and Italy, generally boiled, dried and ground to a flour from which sweet and nutritious cakes are made. In this he doubtless refers to the "necci", a cake of Italy which is a very common food and is highly valued. The polenta, or chestnut pudding, of Italy, is another staple chestnut product which is ground into meal for thickening soups and for bread baking. If these facts were more widely known we would have an increase of that relatively small number of people in America who are at present using chestnut flour, and we might hope to have the time come when, in the leading chestnut districts of America, the nut harvest would be considered the great event of the year, just as it is along the Appenines and Pyrenees. There, for three or four weeks, the principal occupation of every mountain village is the gathering of the nut crop, and on the size of the nut crop the prosperity of the population depends.

The great use of the chestnut in Italy is fairly well known. There is too general a tendency in the average mind to assume that it is restricted to Italy, whereas the chestnut is an important food crop of other leading countries including Spain, Portugal, France, Switzerland, Germany and Japan, and will, I confidently believe, assume with each decade a greater importance in America. The same is true of the walnut crop of the countries mentioned above and of China also. In America the pecan crop is destined to assume a position of equal, or greater importance as the American public learns more of the food value of nuts in general and of pecans in particular.

Experts in agricultural economics and leading students of nutrition emphasize the need for increasing use of nuts in America as a staple food. Yet I can find no record of a single comprehensive cook book, or recipe book, which will show the average housewife how to prepare nuts as a staple food. This book which I hold in my hand is the result of the first year's work at the Keystone Pecan Research Laboratory. It is the first copy off the press of a new book entitled,

"800 Proved Pecan Recipes." The use of nuts to the benefit of the public health and to the benefit of all engaged in nut growing, will not be a practical reality unless we think and act in terms of the average housewife. We must realize that the average housewife is becoming more and more food-wise. Every step that is taken to remove the drudgery of the other phases of housekeeping increases her opportunities to really give some thought and some attention to the food for her family, and the more thought she gives to the subject the more value she will place upon nuts as food. She may aim to cut down the physical effort of preparing meals but in general she is paying increasing attention to the question of whether her meals are properly balanced. No one factor has been more stressed than the relation of proper diet to the family health. This is a natural development of the increased interest in preventive medicine. The general public knows to a degree which it never knew before that to cure a condition or an ailment is much more difficult than to avoid that condition or ailment. From the earliest grades in school information is being imparted to children, and has been imparted during recent years, which is absolutely astounding when compared to the information which we secured at the same age. Children of 9 to 11 years of age are taught in a most interesting manner what the great food needs of the body are, and among the youngest children this information is given added interest and added retentive power by diagrams which stamp themselves indelibly on the child's mind.

Who can measure the influence of this work in creating knowledge of proper food standards of the present generation? Who can calculate to even the slightest degree what this is going to mean during the next generation? All that we need to do to bring nuts into increasing use year after year, is to state the facts, to state them clearly and in definite form, so that one does not have to be a doctor of medicine to get the meaning of the statement. All we have to do is to recognize this increasing public knowledge of food values and to realize how it is growing, not only because of educational movements in that direction but because of a large increase in information along these lines found in publications of the most popular type, and recognizing these factors, to offer suggestions for the use of nuts in the diet which will make them available throughout the year and for every meal of every day, just in proportion as food science shows they are desirable. To do all this in a form which the average house-

wife can understand, is no simple undertaking. We must recognize first the fact that, desirable as nuts are eaten raw, there are a great number of people whose use of nuts would be very limited indeed if we depended upon the consumption in raw form. We must recognize that unless we show women how to use nuts in the main dish of the meal they will be all too likely to serve them at the end of an already sufficient meal, and because of the very high food content of the nuts and their richness this course leads to the incorrect impression that nuts are difficult of digestion. We cannot hope to lead women to make a larger use of nuts in the family diet, and at the same time to avoid their erroneous use at the end of an already heavy meal, unless we show how they should be used earlier in the meal.

This book entitled "800 Proved Pecan Recipes" shows how pecans may be used in varied ways covering every need from soup to nuts. Its real value is based first, on the proved food value of the pecan, second, on the fact that everyone of these recipes has been submitted by a woman who has used it and found it good; then has been checked, tested, and re-checked by skilled dietitians. We call these PROVED recipes because they have been first proved in practice by the women who submitted them, then proved by experts in nutrition in our laboratory.

I make the statement that this is not just a book of 800 recipes; that it is a most important contribution to the health and welfare of the homes into which it will go. I am not swayed by any pride of authorship in saying that. I did not write the recipes in this book. The Laboratory did not write them. They originated with over 5,000 women located in all parts of the United States, in Canada, South America, Europe and Asia.

About a year and a half ago we advertised, offering prizes for those recipes using pecan nuts which had proved best in the homes of those submitting them. For years we had been hearing of the many uses to which pecans had been put, particularly in southern homes, and by tedious work over the years had gathered less than a hundred non-duplicating recipes of which about half proved to have real merit. We hoped to get possibly another hundred or two recipes in response to our offer of prizes. Before the contest closed we had over 21,000 recipes in hand awaiting judgment, which had been submitted by 5,083 housewives in widely scattered territory.

So great was the response that it was evident that our organization for research and verification of these recipes would not be ample unless it were expanded. We saw the need of experts in dietetics with as highly specialized a training on nut foods as possible. We took a complete list of the schools of home economics connected with the leading colleges and institutions of education of America and wrote them asking, "Have you ever tested nut recipes in your work? Have you any graduate whom you would recommend for this testing work and for continued research on pecan nuts as a staple food?" We received replies from practically every college addressed. They were, with one accord, greatly interested but only in a very few cases had they done any work on nuts as food. It was evident that while they were anxious to participate in the research they could not be applied to the immediate pressing problem of testing these recipes, and in most cases lacked the foundation training on nuts which was required. All who were recommended for the work as having specialized training which made them particularly fitted to this work were considered, and the dietitians or executives for the testing were selected from those with the highest scientific equipment.

The head dietitian, Miss Grace Cornell Thompson, was a graduate of Battle Creek College, School of Home Economics, and was highly recommended by the dean, Miss Lenna C. Cooper, for the work done there and at the famous Battle Creek Sanitarium under Dr. Kellogg. Miss Rebecca Kates Barnes, assistant, was a graduate of the Drexel Institution, Philadelphia. Miss Mary Hershey, assistant, was a graduate of Mt. Holyoke College, and with five other assistants the staff was complete.

Even the most highly trained group of dietitians could not do their best work without the most improved equipment. A new brick building with hardwood floors, was provided. On every side there were an abundance of large windows. To avoid fumes and gas nothing but electric ranges were used and these were of the latest improved type, while the temperature of the atmosphere and its purity were under such perfect control that it was impossible, on entering the room where baking and cooking were being done, to know of that fact from any odors. All refuse and papers were instantly burned in an airtight, odorless incinerator. The latest kitchen appliances and equipment were used throughout, iceless refrigeration was em-

ployed, dishes were washed by the latest "wipeless" system with electrically heated water always at hand in abundance. The laboratory was opened at the beginning of the fall of 1924.

From over 21,000 recipes received and tested we have selected over 800 which appear in this book. The selection includes all the prize winners in the contest. It includes representative recipes covering every phase of every meal the year round. The plain meal in the home where staple, healthful food is needed, is amply provided for. Yet dishes are included which would add charm to the fanciest dinner in the most elaborate of homes. Recipes for the school child's luncheon and the motor repast, the afternoon tea, or the informal affair in the evening, are all included. It may be that you and I, because of our interest in growing nuts, might lose ourselves in our enthusiasm on the subject and be inclined to recommend the use of nuts in too many dishes in the same meal. Against this the restraining hand of dietitians and the advice of food experts of high standing have served a most useful purpose. The menus in the back of the book are well balanced. They certainly do not lean in the direction of an over-use of pecans.

We must tell the average housewife that the nut is the best, safest, purest source of the food elements which the system requires. Teaching regarding the functions of proteins, fats, carbohydrates, mineral salts and vitamins is becoming more and more general. We must present these facts in simple, non-technical form so that the average housewife can read and understand them. We have briefly summarized this in the chapter on food values. We must show that the low-protein diet, so strongly advocated by food authorities today, is best carried out by the use of the nut. We have shown that the pecan contains 11% of protein and that this protein is of the choicest character, containing most important amino acids too often lacking in natural foods which the system requires for tissue building and replacement.

Pecan fats are discussed not alone from the standpoint of quantity, although in this the pecan, with over 70% fat, leads all other natural food products, but also the quality of pecan fats is discussed and the reasons for their greater palatability and digestibility are established by facts proven by leading food experts regarding the low melting point of pecan fats.

On mineral salts, we are also inclined to overlook the advantages of nuts.

Regarding vitamins, the importance of the Vitamin A and B content of most of the nuts has been long recognized, and in this respect the pecan ranks high, as shown by recent experiments made by Salmon and Livingstone, reported in the March, 1925 issue of the Journal of Home Economics.

Summing up, therefore, we find that when the latest methods of food analysis are applied to nuts in general and to pecans in particular there is found good reason why nuts have been man's staple food from the beginning. No other food offers so well balanced, so pure, so healthful a supply of those elements required by the human system.

NUT GROWING EAST OF THE ALLEGHENIES

By Thomas P. Littlepage, Washington, D. C.

Mr. President:

I have listened with a great deal of pleasure to what Mr. J. F. Wilkinson has just said. I know so much of his excellent work in connection with northern nut culture that what he had to say was particularly interesting to me. I do not know of anyone who knows more about the northern pecan than Mr. Wilkinson. I recently visited some of the large trees in southern Indiana and in Kentucky which he has climbed from time to time to secure budwood to distribute over the country. One of these trees must be nearly two hundred feet tall. Many of them are as much as forty feet to the first limb. Had it not been for his patriotic interest in this work and his ability to climb these trees, it might have been a long time before we could have gotten budwood from them, if ever.

I wish there were more here in attendance to see the wonderful collection of nuts that Mr. C. A. Reed has on exhibition. It is one of the finest in the world. He has for years been making a very careful survey of nut trees all over the country and has a most complete fund of information on the subect and is entitled to very great credit.

At a meeting of the Executive Committee last night, I proposed that we hold our future meetings at the State Agricultural Colleges in order to get this proposition more clearly before the young men of the country. The students at the various Agricultural Colleges are going to be the county agents and up-to-date farmers of the future. I was specially anxious that we should hold the next meeting at the Agricultural College of Illinois. It is a wonderful institution with a great body of students and if one-third of them only could see the fine collection of nuts Mr. Reed has, together with the lantern slides and pictures he has, it would, in my opinion, produce more results than we have been able to accomplish in our sixteen years of existence.

I doubt if more than a few people in the states of Missouri, Illinois, Indiana and Kentucky have any conception of the thousands of fine pecan trees that grow in each of these great states. I think the time has come for us to get this question squarely before the young men of the agricultural sections of the country. We have been holding many of our meetings in the big cities of the country, but we reach only a few people that way.

As to this proposition of growing nuts east of the Allegheny Mountains, I find that it is difficult to say very much based on actual experience. If anyone should suggest commercial planting of nuts in the East, I should have some difficulty in recommending it because of our lack of experience. I have thirty acres of pecan trees on my farm in Maryland at about the 39th degree latitude and yet, if I had to depend on that farm immediately for a living, I should have to eliminate these pecan trees and grow crops that are suitable to that section. How these pecan trees may behave in the future, I cannot tell but there is no doubt but that much territory east of the Allegheny Mountains is suitable for pecan trees. Many parts of Virginia and Maryland have climatic and soil conditions equal to, or better than that where the native pecan trees are growing. And undoubtedly, the Northern Nut Growers Association can recommend the farmers in the suitable sections to put out a few dozen pecan trees. But we do not know enough about them yet in the East to recommend commercial orchards. It must be understood that I am talking about the territory east of the Allegheny Mountains now and not sections of the middle West which are discussed by others here at this meeting. In summing up the pecan east of the Allegheny Mountains, I think if the farmers who live south of the 39th parallel and have good soil, would put out a few dozen trees, they would probably find them profitable in the future if they took care of them.

The black walnut ought to be a profitable tree to plant in the East. There are no commercial orchards of this nut yet in the East but the native trees bear bountifully and there is every reason to believe that it ought to succeed. I have thought for many years that the black walnut offers the safest prospect for commercial returns of any nut grown in the North.

The chestnut, as we all know, is doomed in the East. The blight has killed nearly all of the native trees and those that remain will go

soon. Years ago, thousands of hillsides in the East were covered with groves of native chestnut trees bearing fine nuts but they are gone now.

The filbert seems to be fairly promising in the East. I have five or six filbert bushes near my garage that bore about a half a bushel of large, well-filled nuts this year. If I had ten acres of these bushes that bore like these, I would have a better return from them than I would off of all the rest of my farm. I believe if we could get the farmers in the East in the proper latitudes each to plant one acre of filberts with an occasional native hazel among them for pollenization that they would get a big return from this acre at very little expense. Therefore, I believe the filbert has a commercial future. But when we speak of growing nuts commercially we have to face the matter of dollars and cents and the return on the investment. We do not always put the things that we enjoy doing on a cash basis and should not, but when we recommend the planting of nut trees for profit, we have to cope with practical facts.

The State of North Carolina is carrying on a program that I think is a very excellent one. They have an organization there to get the farmers to plant a few nut trees. They have an association that advises as to varieties and furnishes the trees in order that the farmer may make no mistakes as to varieties and soil. The county agents cooperate with the farmers and the State Agricultural College, and if we could get that sort of a program worked out in some of the northern states, we could soon get nut culture in the North on an intelligent and probably successful basis. I do not believe that anyone can see the thousands of fine pecan trees in southern Illinois and Missouri, Indiana and Kentucky without feeling that there has been a great neglect and that the scientists of the country ought to have been at work many years ago trying to get these trees propagated and distributed for test purposes, at least. I still have hopes that we will finally get an intelligent, active interest stimulated in nut culture in the North and that the farmers of the future will all have their nut orchards as an adjunct to their general farming and then, time and experience will lead the way and show us the best and most successful varieties to put out in large commercial orchards.

SOME OF THE MORE IMPORTANT INSECTS ATTACKING NUT TREES IN ILLINOIS.

W. P. Flint, Entomologist—Illinois.

Several years ago, the Natural History Survey conducted a forest insect survey of Illinois. During the course of this survey, native woodlands were examined for insect injury in all part of the state. In the course of this work which covered some two years time, many examinations were made of hickory, pecan, black walnut, some chestnut trees, and other nut bearing trees. The insects that attack nut bearing trees in the latitude of Illinois may be gronped in three classes, 1st those that attack the trunk or branches of the tree, 2nd, those that attack the foliage and blossoms, and 3rd, those that attack the fruit or nuts.

Hickory Tiger Beetle. Of the insects that attack the trunk, one of the most common and destructive insects to hickory and pecan throughout the state, is the Hickory Tiger Beetle, or Tiger Borer. This insect is common in all parts of the state, causing injury mainly to the young hickory trees when they are from two to six inches in diameter. The adult beetles, which are over an inch long, are of a purplish-gray color, with somewhat mottled wing covers, make their appearance during June and July. The females make small circular pits in the smooth bark of the branches or main trunk of young trees, and in the centers of these pits deposit their eggs. There are generally several pits at inch or half inch intervals along one section of the trunk. By fall, the young larvae hatching from the eggs have fed under the bark to such an extent as to cause a cracking of the bark. Strings of brown castings will be pushed out from the points where the insects are working under the bark.

During the second year, the beetles burrow in the wood of the tree, often seriously weakening the trunk or branches, and emerge in June or July of the second season as the adult beetles above des-

cribed. Young hickory, or pecan trees which are infested with these insects are apt to be misshapen, stunted, and so weakened that they never make strong healthy trees.

Control Measures

If one will carefully examine young hickories, or pecans during the first part of August, he can detect the points on the trunk where the adult borers have deposited their eggs, and if these pits in the bark are soaked with carbon bisulphid, practically all of the young borers which are then just starting to work in the wood beneath the bark will be killed.

Carbon bisulphid can be easily applied from an ordinary machine oil can with the snout slightly stopped down. In using this chemical, one must keep in mind the fact that it is explosive when mixed with air, and that all fire must be kept away.

Flat Headed Borer. Nut trees in common with most of our shade and fruit trees are often seriously injured, especially the first year or two after they are set by one of the so-called Flat Headed Borers. This insect in its adult stage, is a grayish-bronze beetle with a body wider at the center, blunt at the head, and gradually tapering toward the tail. They are about 1-2 to 3-4 of an inch in length when full grown. The adult beetles are abroad from April to August. They are very pronounced sun loving insects, and always seek the sunny side of trees, or other objects on which they rest. The female beetles lay their eggs in the bark of trees which are in an unhealthy condition, or on healthy trees where some injury has occurred such as a mechanical wound, or sun scald. Nearly all the eggs of this insect will be deposited on the south and southwest sides of the trees. The young borers hatching from these eggs are a yellowish-white in color, with a very pronounced enlargement of the body just back of the head, which gives them their common name of Flat Headed Borer. They feed in the inner bark of the tree during the late summer and fall, and work into the wood of the tree upon the approach of cold weather, forming a cell in which they change during the next spring to the pupal, or resting stage, and come out as adult beetles during the spring and summer.

Control Measures

The young borers may be killed by going over the trees carefully

during the first part of September ,and with a sharp knife, cutting out the borers, their presence being fairly easily detected because of the small deadened areas of the bark, and the bits of sawdust-like castings which are protuding from these areas. Trees that are in a healthy condition and free from sun scald are not likely to become infested by these insects.

The following wash has been recommended by the Michigan Agricultural Experiment Station:

Common laundry soap	25 pounds
Water	1½ gallons
Flake naphthalene	12½ pounds
Flour	1 pound

Place the soap in the water over steam pipes and allow it to soften for a few days. Use a potash soap which will form a smooth mixture, not a soda soap since the latter becomes jellylike. Then place in a double boiler (we use a medium sized wash boiler placed inside a very large one) and cook until the temperature reaches 180° F. Stir in the flour and add the naphthalene and bring the temperature to 180° F., at which temperature the naphthalene will have melted, the melting point of naphthalene being 176°, then cool as quickly as may be, stirring the mixture occasionally. The more rapidly the mixture is cooled, the smaller will be the crystals of naphthalene. The mixture should be applied when warm with a brush.

Hickory Twig Girdler. Hickory and pecan, as well as many other trees are frequently attacked by this insect. Attention will usually be called to the work of the insect by finding a large number of twigs from eighteen inches to two feet or a little more in length lying under the trees in the fall. An examination of the ends of these twigs will show that they have been nearly gnawed off by some insect which has worked around and around the twig, cutting through the bark and wood. This cutting of the twigs is done by a small grayish-brown beetle about one inch long that gnaws around and around the twig until it is nearly ready to break off. An examination of the fallen twigs will show small egg punctures along the twigs, or if this examination is made in the spring, cream colored grubs will be found working within the twig, in many cases reducing the twig to a mere shell of bark. On larger trees, the injury by this insect is not severe, but on small trees, the girdling of the main leaders and sev-

eral laterals may cause a stunted and misshapen tree, as well as seriously check the growth.

Control Measures

The most effective remedy for this insect is to pick up and burn the fallen twigs from mid fall to early winter. At this time, the grubs within the twigs have not worked to such an extent that the twigs are likely to break when handled, and the cut twigs may be more easily seen than if one waits until spring. The beetles have usually all disappeared by mid September, so that the insect will be entirely in the egg, or growing stage in the fallen twigs from about the first of October, until the following September.

Oak Twig Pruner. The work of this insect closely resembles that of the one just described, but the severed twigs will be found to contain a single elongated yellowish grub which has worked inside the twig, usually from a lateral branch, and has cut off the branch working from the inside. These grubs remain in the fallen branches during the late summer and fall, and change next season to brownish, slender beetles about three-fourths of an inch in length. The beetles lay their eggs in the twigs and small branches of many trees, being the most destructive in oak, but frequently causing injury to some of the nut bearing trees, and also to fruit trees. The branches which are cut off by the Oak Twig Pruner will often be somewhat larger than those injured by the Hickory Twig Girdler. In some cases, branches to an inch in diameter and six to seven feet in length are pruned off by this insect.

Control Measures

The most effective control measures are the same as those given for the Hickory Twig Girdler, and consist of picking up and burning the infested fallen branches during the late fall or early winter.

The Walnut Caterpillar. Walnuts, hickories, pecans, and butternuts grown anywhere in the upper Mississippi Valley are nearly sure to be more or less injured each season by black hairy caterpillars which wholly, or partly, defoliate the trees during the latter part of the summer. Many walnuts and young hickories die every year in Illinois due to the repeated stripping by these insects. The adult of these caterpillars is a very pretty buff and brown moth about one inch long when the wings are folded. These moths emerge during the summer

and lay their eggs on the undersides of the leaves in masses of from three hundred or more. The small caterpillars hatching from these eggs feed together in clusters for nearly their entire life. At intervals in their growth, they crawl down the trunk of the tree and gather in a large mass usually just below the lower branches. Here they shed their skins and after the process is completed, crawl back up the tree to their feeding place, leaving their empty cast skins hanging in an unsightly mass on the trunk of the tree. The caterpillars become full grown during late August and September. They crawl to the ground and burrow below the surface for one to three inches, and change to a pupal stage emerging as moths the following summer.

Control Measures

As the moth of the Walnut Caterpillar flies to the leaves of the trees where she lays her eggs, it is not possible to prevent damage by these insects by banding the trunk of the trees with some sticky substance, although this is sometimes done. The best method of preventing damage by this insect is to spray or dust the trees with arsenate of lead, two pounds to fifty gallons of water, or if dust is used to cover the leaves as soon as the caterpillars appear on the leaves. If the trees are so large, or growing in situations where this cannot be done, many of the caterpillars can be killed by crushing them when they come down the tree to shed their skins.

Nut Weevils. These insects are entirely different from those just described, and confine their attacks to the fruit of the nut bearing trees. There are a number of these nut weevils which attack the fruit of pecan, chestnut, hickory, and hazelnut, as well as several species that feed on acorns. The life history of these insects is much the same for all species. The adult weevils are grayish, brownish, or yellowish beetles varying in size from a fourth up to one-half inch in length, with long, slender beaks projecting from the front of their heads. They usually make their appearance during late July and August. Mating takes place, and the females deposit their eggs in the nuts or acorns which they attack. The eggs are laid in cavities eaten into the fruit of the nuts, these cavities extending for some distance into the nut, and being drilled by the weevils with their long snouts. After drilling the hole in the nut or acorn the female weevil turns around and by the aid of a long ovipositor, inserts her egg. The

grubs hatching from these eggs feed on the nuts and cause them to drop. The grubs continue to feed inside the nuts after they have fallen to the ground, and on becoming full grown, eat circular holes through the shell and work their way into the ground for some distance. There they construct small cells in which they pass the winter. Late the next season, they emerge as adult weevils. There are some exceptions to this general life history, a few of the insects requiring two years to complete their growth, and occasional individuals appearing earlier in the season than late summer.

Control Measures

The Nut Weevils are, on the whole, very difficult insects to control. They are all native of this country, and most of them have several food plants. Brooks in his excellent bulletin on these insects, (West Virginia Agricultural Experiment Station, Bull. 128), recommends fumigating the dropped nuts with carbon bisulphid before the weevils have left the nuts and gone into the ground.

Nut Curculio. Another somewhat similar class of insects which attack many of our nut trees is known as the Nut Curculios. They are closely related to the apple and the plum curculios, which are among the worst insect enemies of apple, peach, plum, and some of our other fruits. The curculios somewhat resemble the weevils in appearance, but have a shorter snout, and differ in the time of their appearance and their manner of attack on the nuts. The adult curculios are rather robust beetles, of a dark brown to blackish appearance with light markings on the back of the wing covers. The Butternut Curculio, Black Walnut Curculio, and Hickory Curculio, are three of the most common species. On the butternut and black walnut, the eggs are deposited in small slits eaten in the husk of the nut and are laid during the first part of July up to the middle of August. The white, footless, fat-bodied grubs, hatching from these eggs, burrow in the husk of the nut, causing the infested nuts to drop. The insects complete their growth within the nut, burrow into the ground, and transform to beetles during the late summer. A very similar species attacks the hickory and pecan.

Control Measures

Destroying the newly dropped nuts by picking up and burning is

probably the most effective method of controlling these insects, although the expense of this operation make it impossible under most conditions. If the soil around the infested tree can be cultivated during the late summer, many of the insects can be killed. This also is not usually possible in locations where the hickory or pecan is being grown. Where these insects are on the increase, it would probably pay to pick up and destroy the infested nuts every second or third year if the practice is found too expensive to follow each season. Fortunately there are several insect enemies of these insects that tend to keep them in check. Mice and shrews eat large numbers of the weevil and curculio larvae in the ground.

DISCUSSION IN REGARD TO HICKORY GIRDLER

Pres. Weber: One end of the twig looks as if someone had tried to twist it off?

Mr. Flint: Very often. The insect makes this girdle about half way and the twig will hang in the wind and twist.

Pres. Weber: Would it not be advisable to take your knife and cut it off and finish it up at once?

Mr. Flint: Yes, it would.

A Member: Do the bugs select any particular place with reference to the leaf stem?

Mr. Flint: Not so far as I have ever observed. They may be on a twig that is up to at least half an inch in diameter; sometimes they will cut a larger twig than that. There is another borer that cuts branches up to three inches but it does not work up here.

A Member: That particular insect down in Texas always selects the base of the leaf stem to deposit the egg.

Mr. Flint: Yes, but not for the girdle. It always deposits its eggs at the leaf scars along the twig. This is what they call the hickory twig girdler or pecan girdler or persimmon girdler.

A Members Does it attack oak?

Mr. Flint: Yes, sir, and the elm, especially the Wahoo elm.

Pres. Weber: English Walnut?

Mr. Flint: Yes, sir, very much so, and the black walnut.

A Member: In Texas it is called the sawbuck.

Mr. Flint: Yes, sir, and they have another one in Texas. Of course the picking up of twigs and burning them is of very little value if your plantation is near a woodlot where they are breeding all the time because you get so many of them out of the woodlot.

Dr. Colby: When would you put that arsenate of lead on?

Mr. Flint: That should be put on as a regular practice about the first of July. I am saying that for the latitude of Central Illinois. South of that it would come earlier. North of that it would come later. Any one of you can make a few observations in your own plantation for two or three years and you will know ust about when these worms are coming. They come just about the same time each year.

Pres. Weber: The leaves will be sort of dead looking?

Mr. Flint: Yes sir; when they first start they will simply skeletonize your leaf.

The President: The leaf appears to be dead and the larva is just started.

Mr. Flint: Yes sir.

A Member: Are those the ones that hang in bunches in a web on the branches?

Mr. Flint: They hang in bunches on the trunk but the one that makes a web on the branch is the fall web worm. It is a different worm. It comes from a moth.

A Member: Can you use a torch to burn them out or use a step ladder in a small plantation and then destroy them?

Mr. Flint: Yes, you can if the trees are small.

A Member: Do these defoliating insects attack any other kind of trees, apple trees, for instance?

Mr. Flint: You have another species. Between the hickory moth and the yellow-necked caterpillar and the red-hump caterpillar, there is almost no difference in the moth; a little difference in the larva.

Mr. Spencer: I was told by a gentleman who trims trees that if you get this substance of which fly paper is made and put that on the trees it will stay all summer and you can catch these moths.

Mr. Flint: You can put that Tree Tanglefoot on the trunks of the trees and you can catch the canker worms that crawl up the trunk but this insect flies up and lays its eggs on the leaves. It is practically useless for hand made moth. The eggs are laid up in the trees by a moth that flies.

A Member: But when they come down you may get a few?

Mr. Flint: You can get a few of them.

Pres. Weber: The mischief is already done?

Mr. Flint: The Tanglefoot will get your canker worm. It is very effective for that insect but for these it is of little value.

On the Nut Weevil.

A Member: Where does it hibernate?

Mr. Flint: On trash and litter through wood lands around your plantation.

The Member: On the ground?

Mr. Flint: In the surface of the ground. We have taken large numbers of them—the largest number we have ever taken was in a rotting stick on the ground, where they had lain for two or three years.

A Member: Have you ever seen the Codling Moth attacking Japanese Walnut?

Mr. Flint: Not on Japanese Walnut. We have bred Codling Moth several times from the green shells of hickory nuts.

A Member: I have found it on the heart nut; rather badly injured, the crop on one tree.

Mr. Flint: Of course you all know the Codling Moth is a pest of the English Walnut in the west and they have to spray or dust for it out there just as we have to spray for it on apples. I don't believe it will ever become very much of a pest of any of the nuts we grow here. It doesn't like these things as well as it likes apples and plums and probably would not get very plentiful on the nuts.

A Member: Are there any birds that attack the hand made moth?

Mr. Flint: I couldn't give you any reports of the birds feeding on it. The caterpillars are eaten by the yellow-billed cuckoo. It likes hairy caterpillars and it eats a great many of them just as it eats a great many Gypsy moths.

A Member: How about these flat headed apple borers?

Mr. Flint: That is an insect I meant to mention. There are two species that look alike and work alike. That insect lays its eggs on the trunks of trees during the late spring and early summer. It is flat, grayish,—it looks gray, but it is really a beautiful bronze beetle. It lays its eggs in the trunk. It will lay its eggs in a place where the bark has been injured. 75% of the eggs will be laid on the south or southwest sides of the tree. We have a great deal of trouble with that beetle on shade trees. You would have the same trouble with it on nut trees. Trees that are newly set and exposed to the bright sun; there will be little areas that will be sun scalds and this insect likes those sun scald spots. It will lay its eggs there. This insect does not go into the wood. It bores the first year into the bark and this keeps enlarging as the insect grows and by fall that burrow may be three or four inches long and about two inches square on a small tree. It then goes into the trunk and makes a cell there, changes in that cell to the adult beetle and comes out the next year. It takes two years to complete its growth. That insect is common on nut trees, shade trees and forest trees. The best remedy for it is to go over the newly set trees or injured trees, the latter part of August or first of September and wherever you see any little dead areas in the bark, especially if there are little brown castings coming out, you will find there are borers working in the bark. You can usually cut them out that time of the year. You can get them sometimes with carbon disulphide.

Pres. Weber: What are some of the natural enemies of the beetle?

Mr. Flint: They have several insect enemies of the same family as the ant, bees and wasps and some bird enemies; the wood peckers.

Pres. Weber: The Flicker?

Mr. Flint: Not much; his food is usually ants.

A Member: Does the common June beetle do much damage to nut trees?

Mr. Flint: I have known them to completely defoliate a tree and of course there would be damage. There is nothing one can do except spray in that case. You can keep track of the years that the June beetles are coming. They come in three year cycles. 1918, 1921, 1924, and they will be here in 1927.

Pres. Weber read letter from Dr. W. A. Taylor, Chief of Bureau of Plant Industry:

Washington, D. C., September 16, 1925.

Mr. Harry R. Weber,
President, Northern Nut Growers Association,
Hotel Statler, St. Louis, Missouri.

Dear Mr. Weber:

Mr. C. A. Reed of this Bureau has strongly urged me to attend your annual meeting to be held in St. Louis September 22 to 24, inclusive. However, I am unable to accept this invitation, as important matters necessitate my attention here just at this time.

May I take this occasion, however, to commend the Association for the high quality of research work that has been conducted by several of its lay members during recent years. The investigations in the science of asexual propagation by Dr. Morris, Mr. Jones, and others, have resulted in definite and important contributions to our fund of horticultural knowledge. The work of Mr. Bixby and many others in search of new varieties has been of high order, as have been the writings of others of your members, particularly Doctors Morris and Deming and Mr. Littlepage.

Permit me to assure you of my appreciation of the support given the project of nut culture under the immediate direction of Mr. Reed in our Office of Horticultural Investigations. As you may know, the Department has recently established a very complete collection of northern species and varieties on the experimental grounds at Arlington Farm on the Virginia side of the Potomac, directly opposite Washington. With supplemental plantings of such new varieties as may appear in the future, this collection should make a valuable asset to the whole northern nut industry. It will be particularly useful in varietal studies and breeding work, as well as in connection with other studies.

In conclusion may I assure you of the interest of those in this Bureau who are directly connected with the work your association is doing. Please accept my assurance of continued co-operation on the part of the Bureau staff and my personal regards to those of your members whom I have the pleasure of knowing personally.

Very truly yours,

WM. A. TAYLOR,
Chief of Bureau.

NOTES ON NUT TREE PLANTINGS AT THE E. A. RIEHL FARM, ALTON, ILLINOIS, 1925

1. Native American Sweet Chestnut. Planted in 1863 by Mr. Riehl; now about 70 feet high; 8 feet in circumference; (top recently blown off). When tree was about 30 years old, Mr. Riehl top worked it with some Rochester scions. Male parent in originating Mr. Riehl's best seedlings, Fuller and Progress.

Cultivated Orchard. Chestnut trees 25-28 ft. apart. (Too close). Original trees of Mr. Riehl's two best seedling chestnuts, Fuller and Progress.

2. *Fuller*: A variety which sets the standard for quality. Nut of good size, somewhat later in ripening than the Boone variety. Tree a good grower, prolific bearer.

3. *Progress*: About same size as Fuller but quality not quite as good.

4. *Parry*: Nut large size, fair quality. Tree may not be entirely hardy.

5. *Rochester*: Original tree; a seedling of unknown parentage from Rochester, N. Y. Probably has both Japan and American sweet blood. Used as female parent in originating Fuller and Progress varieties. (Badly injured by sleet storm, winter of 1924-5.—Somewhat off main route.)

Chestnut Orchard: Intermittant Cultivation

6. *Lovett*: Seedling of Paragon. Needs cultivation to produce large nuts.

7. *Boone*: Originated in 1896 by George W. Endicott of Villa Ridge, Illinois. Nut medium size, ripens early, first nuts which fall to ground are free from bur. Nut good quality. Tree good grower and productive. One of the very best for commercial use.

Fuller: Orchard planting—Quality nuts. The best and longest keeper.

Various Nut Species in Sod

8. *New seedling walnut,* 2 yrs. from graft. Grows too heavy and must be supported. This one broke with the great weight of the top, as did several others.

9. *Stabler* walnut. Immediate graft, May 5th, 1925.

10. Beginning of a hickory grove. Grafted April 20, 1925.

11. 5 yr. old *Thomas* in bearing.

12. *Fairbanks* on pecan, 1924.
Profitable use of rough hilly land, preventing erosion. Pasturage—sheep and cows; blue grass sod.

13. *Champion* chestnut: Original tree. A seedling of Rochester.

14. *Papaw* trees: Remarkable size—quality fruit. Very good for those who like them.

15. Black walnut grafted on white walnut. Rather unusual operation.

16. Chestnut fertilized with nitrate of soda, compared with one of same variety, not fertilized.

17. Parent tree of promising black walnut seedling. Nut large, of fine flavor, and excellent cracking quality. Tree remarkably fast grower, and seems to resist fungus disease that affects others. Has borne only 2 small crops.

18. Group of *Rochesters* bearing good crop.

19. Chestnut *Riehl Seedling No. 60.* Parent tree; bears almost as constantly and heavily as Boone. Nuts, early, sweet and of fair size, generally drop from the tree before the bur.

20. *Chestnut No. 61.* Parent tree; nuts good, large, attractive color and drop from the bur.

21. *Lovett* in sod. Nuts small. Needs cultivation.

22. Group of *Progress,* topworked.

23. *Major* pecan, grafted in 1923.

24. *Thomas* walnut bearing the best crop of walnuts on the place, in grove of older Thomas trees. This is the best point from which to observe what can be done with nuts on land too rough to be used for ordinary crops.

25. *Chestnut No. 68.* Parent tree; the earliest of all; gathered 28 lbs. on Sept. 4th, 1925. Nuts are medium size and of fairly good quality.

26. *Cedar Rapids* hickory. Grafts in top of bitternut. 1924.

27. Pecans: *Burlington, Butterick, Witte* and *Busseron.*

28. Black Walnut—*New* walnut on *Thomas* stock. Method: Ordinary bark graft.

29. Propagating Grounds: Nursery—Chestnuts: Budding; Grafting.

30. Return to house—Notice efficient manner of clearing rough land overgrown with brush, by goats.

31. Persimmon—*Early Golden* variety; one of the best.

Supplementary Notes—In a Ravine Behind the Barn

32. *Calhoun* hickory, promising old seedling; nut good quality, excellent cracker. Large size.

33. *Rockville hican*: Originated in Missouri; good nut for this section. Large size, good quality, thin shell.

34. *Thomas* black walnut: Tree planted about 1902.

35. *Japanese* walnuts.

36. *Hard-shelled almond.* Probably the *Ridenhower* variety. Originated in Illinois. Will grow and bear fruit where the peach will.

TREASURER'S REPORT

Northern Nut Growers' Association

Aug. 31, 1924 to Aug. 31, 1925

RECEIPTS

Balance Aug. 31, 1924 from previous year	$ 175.67
Membership Plan No. 6	157.25
Membership Plan No. 7	29.25
Membership Plan No. 9	16.50
Membership Plan No. 11	247.50
Membership Plan No. 12	5.50
Transfer of Fund from former Treasurer	.13
Contributions	608.00
Sales of Literature	2.25
Advertisements	21.50
Interest	.20
American Fruits Publishing Co. (6 subscriptions to American Nut Journal)	10.50
	$1,274.50

EXPENDITURES

Expenses 15th Annual Convention (N. Y.):	
Reporting Convention, Mrs. B. W. Gahn	$ 50.00
Hotel Bill, Mrs. B. W. Gahn	14.00
Meals, Mrs. B. W. Gahn	9.00
Street car fare, Mrs. B. W. Gahn	.70
Trip to Stamford, Ct., Mrs. B. W. Gahn	1.30
Receipt Book, Dr. W. C. Deming	.10
Telegram, Dr. W. C. Deming	.30
Cartage, Dr. W. C. Deming	1.00
Car fare	.16
Printing 500 copies 15th Annual Report	296.00
Freight on 15th Annual Report, Albion, N. Y., to Washington, D. C.	2.49
1 Halftone	5.52
500 Clasp envelopes	7.20
500 Manila envelopes	2.00
500 Membership Slips	3.50
1000 Catalogue cards	5.50
5000 Folders	50.00
5000 Membership Blanks	16.25
1500 Envelopes	11.00
2000 Letter Heads	12.50
10000 Envelopes—2 sizes	50.00
P. O. Box rent for Secretary at Washington, D. C.	11.70
P. O. Box keys for Secretary at Washington, D. C.	.40
Rubber Stamp for Secretary at Washington, D. C.	1.25
Secretarial Work, Mrs. B. W. Gahn, 8 months	200.00
Secretarial Work, Help for Mrs. Gahn	25.00

Postage stamps sent from Treasurer to Secretary	32.00
Other Postage	89.51
Postal Cards—single	1.30
500 Double postal cards and printing	16.00
Postage and Insurance	.52
Registry Fees	.95
Balance on hand Aug. 31st, 1925	351.33
Middletown Natl. Bank	4.43
Litchfield Savings Society	2.59
Cash on hand	$1,274.50

APPENDIX—BUSINESS MEETINGS

A short business meeting of the association was called by the President in the evening of September 21, 1925 at the Hotel Statler. The matter of Mr. J. S. McGlennon's membership was brought up for discussion. It was moved and seconded that the name of Mr. McGlennon be dropped and that he be declared ineligible to membership in the Northern Nut Growers Association. The motion carried.*

There was considerable discussion as to the time and place of meeting for next year. The motion to meet twice, once in August and once during the holidays, was lost. The motion to meet at a State College was carried. The University of Illinois was selected as a meeting place, the time to be left with the executive committee.

The following officers were elected for 1926-27:

Dr. W. C. Deming ..... President
S. W. Snyder ..... Vice-President
Dr. A. S. Colby ..... Secretary
H. J. Hilliard ..... Treasurer

Meeting adjourned.

*Editor's Note: President Weber, at the conclusion of the Convention, wrote Mr. McGlennon notifying him of the action of the Association.

ADDITIONAL BUSINESS AND RESOLUTIONS

Wednesday Afternoon, Sept. 23, 1925—Pres. Weber in the Chair.

Motion by Mr. Reed that we reconsider the decision that was made on Monday, without having heard from Dr. Colby or the University, and that we leave the place of meeting, and the type of meeting we shall have, in the hands of the executive committee, the newly elected president, vice-president, Dr. Colby and the board of directors.

Carried.

The following resolutions were adopted:

RESOLVED, That this association take definite steps towards creating interest in nut growing in the state agricultural colleges, to the end that the nut trees of the states be preserved and to the end that a practical nut industry be established. That a strong committee of twelve members be appointed to endeavor to secure immediately the active co-operation of the agricultural colleges and that the state governments be enlisted in this work.

Mr. C. A. Reed's wide acquaintance with nut growers in all parts of the country, his fund of information, his simple hearted interest in the subject and his vision of our needs have led to the successful outcome of the St. Louis meeting of the Northern Nut Growers Association. In view of these facts it is proposed that we extend to Mr. Reed a formal vote of thanks in appreciation of services rendered.

Carried.

For two years the destinies of the Northern Nut Growers' Association have been directed wisely and with outstanding loyalty, by Mr. Harry R. Weber. The sincere appreciation of the Association of Mr. Weber's services is hereby recorded.

The Association is especially grateful also, to the unusual number of persons prominent in their several lines, who have come to the convention, some of them from long distances, and by who their excellent addresses have greatly interested and enlightened all in attendance.

To the citizens of St. Louis generally, to the local convention and publicity bureau for unprecedented publicity, to the earnest, tireless, markedly successful welcoming and pronounced courtesy of Hon. Frank H. Wielandy, to the management of the headquarters hotel and to the press of St. Louis, the Association extends sincere and hearty thanks.

RESOLVED, That the Northern Nut Growers' Association, in Convention assembled, Sept. 23, 1925 record its sense of loss in the death of E. A. Riehl, one of its most prominent members.

E. A. Riehl. Godfrey, Illinois, prominent nut culturist, died of acute appendicitis January 23d at St. Joseph's hospital, Alton, Illinois, aged 87 years, after an illness of scarcely 12 hours. Mr. Riehl was active to the end, personally conducting operations in his property and driving his automobile from place to place. Only two days before his death as he stepped from his car he declared that his health was excellent and that he was greatly interested in the prospective meeting of the Northern Nut Growers' Association (of which he was long a member) at his home next fall.

He was born in St. Louis county on a farm adjoining that of General Grant. He moved to Alton in 1861 settling on the farm on the bluffs at what is now Riehl Station, seven miles above Alton. The ground was rugged and not very fertile, but Mr. Riehl transformed it into a garden spot which attracted hundreds of visitors. He was progressive to a degree, always open to new ideas, a student and an originator. One of his ideas which bore fruit in his declining years was a chestnut grove. He was the first in Illinois to take up chestnut growing on a commercial scale and was remarkably successful. Last fall and in preceding years he harvested big crops. The damage by blight in Eastern states caused unusual demand for his product, for the blight has not reached his section of the country. He was a prominent grower of peonies and of other flowers at his farm, "Evergreen Heights." He was a member of the Alton Horticultural Society, American Pomological Society and the Northern Nut Growers' Association.

Also Dr. Dennis, of Iowa, who did much to bring to notice improved native nuts. A hickory named after him is regarded by E. A. Riehl as one of the best. At the time of his death Dr. Dennis was actively engaged in work for the advancement of Northern Nut culture.

ALSO, Dr. D. C. Brockway, Ottumwa, Iowa, died August 21, 1925. He was a well known surgeon and was much interested in nut culture, having a pecan grove in the south.

ALSO, J. M. Patterson, 77 No. Franklin street, Wilkes Barre, Pennsylvania, who died February 9, 1925.

(Signed) A. S. Colby,
Ralph T. Olcott,
Robt. T. Morris,

Mr. Reed: I move that we formally show our appreciation in a definite way and that we create a new office and elect Dr. Morris to that office. I move that Dr. Morris be elected Dean of the Northern Nut Growers Association. Motion Carried.

ILLUSTRATED LECTURE

Mr. S. W. Snyder gave, on Sept. 22, a most interesting and instructive lantern slide lecture on "Nut Growing in Iowa." Because of the darkened audience room it was not possible to take notes on the lecture.

BANQUET

The evening session of Wednesday, September 23, 1925 was occupied by a banquet at the Hotel Statler with Hon. R. W. Dunlap, Assistant Secretary of Agriculture, as the guest of honor. Hon. F. H. Wielandy of St. Louis, ex-State Fish and Game Commissioner, acted as toast-master.

This banquet was one of the greatest events in the life of the association. The toast-master was eminently successful in securing a general response from those called upon. Secretary Dunlap and Dr. Morris will be especially remembered for their inspirational and witty speeches.

EXCURSION

On Thursday the Convention adjourned to the Riehl Homestead, "Evergreen Heights", at Alton, Illinois, where the day was spent in the chestnut orchards. The entire party was most hospitably entertained by the daughters of the late E. A. Riehl. Expressions of appreciation were unanimous as to the kindnesses shown the party, the personally conducted tour of the orchards of bearing nut trees, the wonderful collection of nuts on exhibition and for the bountiful dinner served out on the beautiful lawn overlooking the River.

The Convention adjourned late in the afternoon, all members attending voting it one of the most successful ever held.

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NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

SEVENTEENTH ANNUAL MEETING

LANCASTER, PA.

SEPTEMBER 14, 15, 16, 1926

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

SEVENTEENTH ANNUAL MEETING

LIBR
NEW YO
BOTANIC
GARDEN

LANCASTER, PA.

SEPTEMBER 14, 15, 16, 1926

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Hybrids and Promising Seedlings—C. A. Reed, J. F. Jones, W. G. Bixby, Howard Spence, J. A. Neilson, S. W. Snyder, R. T. Morris

Nomenclature—C. A. Reed, R. T. Morris, J. F. Jones, J. A. Neilson

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Neilson, James A., Hort. Exp. Sta., Vineland, Ontario
Smith, E. D., & Sons, Winona, Ontario
Wayman, S. T., Beamville, Ontario

CHINA

*Wang, P. W., Sec'y., Kinsan Arboretum, 147 No. Szechuan Road Shanghai

COLORADO

Walker, U. H., Nucla

CONNECTICUT

Bartlett, Francis A., Stamford
Deming, Dr. W. C., 983 Main Street, Hartford
Hilliard, H. J., Sound View
Hungerford, Newman, R. F. D. No. 2, Box No. 100, Torrington
Lane, Emma, Box 87, Darien
Merritt, Joseph, 287 Homestead Ave., Hartford
Montgomery, Robt. H., Cos Cob
*Morris, Dr. Robert T., Route 28, Box No. 95, Cos Cob
Pomeroy, Eleazer, 120 Bloomfield Ave., Windsor
Sessions, Albert L., 25 Bellevue Ave., Bristol
Weed, C. C., 200 North Street, Stamford
Williams, Dr. Chas. Mallory, Box No. 75, Stonington

DISTRICT OF COLUMBIA

Close, Prof. C. P., Pomologist, Dept. Agr., Washington
Gahn, Mrs. Bessie W., 218 W. Clifton Terrace, Washington

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*Life Member

Green, Mrs. Avice M., Ridge Road, N. W., Washington
Greene, Karl W., Ridge Road, N. W., Washington
Jacob, H. J., Washington
*Littlepage, T. P., Union Trust Bldg., Washington
National Pecan Groves Co., 510 Bond Bldg., Washington
Reed, C. A., Bureau of Plant Industry, Washington

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Spence, Howard, The Red House, Ainsdale, Southport

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Wilcox, Prof. Alice W., Brenau College, Gainesville

ILLINOIS

Ade, W. H. & Co., 236 N. Clark St., Chicago
Anderson, Dr. W. H., University of Illinois, Urbana
Brown, Roy W., 220 E. Cleveland St., Spring Valley
Colby, A. S., University of Illinois, Urbana
Corsan, Mrs. G. H., Room 1500, 19 So. Lasalle St., Chicago
Curtiss, L. W., Gladstone
Delp, Joe, Morrison
Elleman, John H., 210 Maple Hill Road, Glencoe
Endicott, R. B., Villa Ridge
Gibbens, Geo. W., Godfrey
Gould Company, Onarga
Johnson, P. B., Box 72, Marion
Mosnat, H. R., 10910 Prospect Ave., Morgan Park, Chicago
Nash, C. J., 1302 E. 53rd St., Chicago
Poll, Carl J., 1013 E. Seminary St., Danville
Riehl, Miss Amelia, Godfrey
Rosenberg, H. B., Granite City
Spencer, Henry D., 275 W. Decatur St., Decatur
Watson, John P., Carter
Whitford, A. W., Farina

INDIANA

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Fowler, J. L., 419 Walnut St., Union City
Isakson, Walter R., R. F. D., Hobart
Staderman, A. L., 129 S. 7th St., Terre Haute
Wilkinson, J. F., Rockport

IOWA

Adams, Gerald W., R. F. D. No. 4, Moorehead
Bricker, C. W., Box 194, Ladora
Harrington, F. O., Williamsburg

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*Life Member

Luckenbill, Ben W., Box 47, Mediapolis
MacDonald, A. B., Forestry Dept., I. S. C., Ames
Meints, A. Rock, Dixon
Mock, Charles A., LeMars
Snyder, S. W., Center Point
Snyder Bros., Center Point
Snyder, D. C., Center Point
Van Meter, W. S., Adel

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Gray, Dr. Clyde, Horton
Hitchcock, Chas. W., R. No. 1, Belle Plaine
Miller, H. S., Morrill
Rice, E. C., 303 S. Hillside Ave., Wichita
Stenger, Joseph, R. F. D., Wayne

KENTUCKY

Barner, Ernest, Box 702, Berea College, Berea

LOUISIANA

Fullilove, J. H., Box 157, Shreveport
Fullilove, J. H. Jr., Box 157, Shreveport
Jackson, A. C., Box 993, Shreveport

MARYLAND

Johnson, Charles E., 218 E. Isabella St., Salisbury
Jordan, Dr. Llewellyn, 100 Baltimore Ave., Tacoma Park
Mehring, Upton, Keyman
O'Connor, P. H., Bowie
Wall, Alfred W., 2305 W. Lanvane St., Baltimore
Watkins, Asa H., Mt. Airy

MASSACHUSETTS

*Bowditch, James H., 903 Tremont Bldg., Boston
Bowles, Francis T., Barnstable
Bryant, Dr. Ward C., Greenfield
Combination Orchard Co., Waltham
Hale, Richard W., 60 State St., Boston
Johnson, Roscoe E., Barre
Lamb, Dr. Harold W., Burnette Ave., So. Hadley Center
Russell, Newton H., Burnette Ave., So. Hadley Center
Sprague, P. W., 10 P. O. Square, Boston
Williams, Moses, 18 Tremont St., Boston

MICHIGAN

Burke, Mrs. Oliver W., 1525 Edison Ave., Detroit
Copland, A. W., Birmingham
Gardner, Prof. V. R., Mich. Ag. Col., E. Lansing
Graves, Henry B., 1430 Granger Ave., Ann Arbor
Hoenicke, Charles R., 13410 Electric Ave., Detroit
Kellogg, Dr. J. H., 202 Manchester St., Battle Creek
*Linton, W. S., Saginaw
Penny, Senator Harvey A., 425 S. Jefferson Ave., Saginaw

*Life Member

Stocking, Frederick W., 3456 Cadillac Ave., Detroit
University of Michigan, Botanical Dept., Ann Arbor

MINNESOTA

Andrews, Miss Frances E., 245 Clifton Ave., Minneapolis
Weschcke, Carl, 98 S. Wabasha St., St. Paul

MISSOURI

Barnhart, F. L., Barnhart
Funsten, R. E., Company, 1520 Morgan St., St. Louis
Pettus, E., 16th St. & Locust, St. Louis
Purdom, J. Lesley, Harris Teachers College, St. Louis
Stark, P. C., Louisiana
Stark Bros. Nursery, Louisiana
Tiedke, J. F., R. F. D., No. 7, Rockville
Tower Nut Products Co., 4949 Pershing St., St. Louis

NEBRASKA

Caha, William, Wahoo
Miller, R. D., Care of Miller & Paine, Lincoln

NEW JERSEY

Garber, U. G., 80 Newkirk St., Jersey City
Hilferty, Charles D., 647 Prospect St., Westfield
Hurst, Mrs. A. E., 20 Beech St., Rutherford
*Jaques, Lee W., 74 Waverly St., Jersey City
Landmann, Miss M. V., R. F. D. No. 2, Cranbury
Woods, Geo. R., 205 Wyoming Ave., Maplewood

NEW YORK

Abbott, Frederick B., 1211 Tabor Court, Brooklyn
Ashworth, Fred L., Heuvelton
Bixby, Willard G., 32 Grand Ave., Baldwin
Bixby, Mrs. Willard G., 32 Grand Ave., Baldwin
Brinton, Mrs. Willard Cope, 36 West 59th St., New York
Buist, Dr. G. L., 3 Hancock St., Brooklyn
Clark, George H., 31 Exchange St., Rochester
Coyle, David C., 10 Miller Place, Bronxville
Cothran, John C., 104 High St., Lockport
Ellwanger, Mrs. W. D., 510 East Ave., Rochester
Gager, Dr. C. Stewart, Botanical Gardens, Brooklyn
Hodgson, Casper W., World Book Co., Yonkers
*Huntington, A. M., 1 E. 89th St., New York City
Jewett, Edmond G., 16 S. Elliott Place, Brooklyn
Liveright, Frank I., 120 W. 70th St., New York City
MacDaniels, S. H., College of Agriculture, Ithaca
Northern New York Developing Co., 32 Nassau St., New York City.
Olcott, Ralph T., 39 State St., Rochester
Oswald, Edward, 311 W. Beard Ave., Syracuse
Pomeroy, A. C., Lockport
Reimold, O. S., Yonkers-on-Hudson, Yonkers

*Life Member

Solley, Dr. John B., 213 E. 61st St., New York City
Teele, Arthur W., 120 Broadway, New York City
Tukey, Prof. Harold B., Hudson
Vollertsen, Conrad, 375 Gregory St., Rochester
Wile, M. E., 955 Harvard St., Rochester
*Wissman, Mrs. F. deR., 9 W. 54th St., New York City
Wyckoff, E. L., Aurora, Cayuga Co., Aurora

NORTH CAROLINA

Matthews, C. D., Dept. of Agr., Raleigh

OHIO

Barton, Chas. H., Lancaster
Beatty, Dr. Wilbur M. L., R. 3 Croton Rd., Centerburg
Fickes, W. R., R. No. 6, Wooster
Hamilton, Chas. E., 52 Jefferson Ave., Columbus
Neff, Wm. N., Box 31, Martel
Snyder, C. E., 510 W. 4th Ave., Columbus
*Weber, Harry R., 123 East 6th St., Cincinnati
Walker, C. F., 2851 E. Overlook Rd., Cleveland Heights

OKLAHOMA

Miller, Joseph C., Marland

PENNSYLVANIA

Althouse, C. Scott, 540 Pear St., Reading
Baum, Dr. F. L., Boyertown
Bohn, Dr. H. W., 34 N. 9th St., Reading
Bonney, Robert D., 204 W. Winnona Ave., Norwood Station
Clark, D. F., 265 19th St., Harrisburg
Druckemiller, W. H., 31 N. Fourth St., Sunbury
Fritz, Ammon P., 35 E. Franklin St., Ephrata
Gable, Jr., Joseph B., Stewartstown
Gribbel, Mrs. John, Box 31, Wyncote
Grin, Wm. H., Hamburg
Hartman, J. W., Sligo
Hershey, Floyd E., Downington
Hershey, John W., Downington
Hile, Anthony, Curwensville
Hess, Elam G., Manheim
Hammond, Dr. J. T., 3rd, Newton
Jenkins, Charles F., Farm Journal, Philadelphia
Johnson, Mrs. Georgia P., Orchard Knob Farm, Dallas
*Jones, J. F., Box 527, Lancaster
Kaufmann, M. M., Clarion
Knife, Irving P., 5 E. Ring St., Norristown
Knowles, E. B., 145 E. Clay St., Lancaster
Krebs, Harry B., Mercersburg
Leach, Will, Cornell Bldg., Scranton
Paden, Riley W., R. No. 2, Enon Valley
Raab, W. L., Box 41, Dallastown
Rittenhouse, Dr. J. S., Hill Croft Fruit Farm, Lorane

*Life Member

*Rick, John, 438 Penn. Square, Reading
Smith, Dr. J. Russell, Swarthmore
Smedley, Samuel L., R. F. D. No. 1, Newton Sq.
Schultz, Oscar S., 142 N. Reading Ave., Boyertown
Theiss, Lewis Edwin, Munsey
Wilhelm, Dr. Edward A., Clarion
*Wister, John C., Clarkson & Wister Sts., Germantown
Woodward, Laura E., Westchester
Zimmerman, Dr. G. A., The Fernwood, Piketown

RHODE ISLAND

Allen, Phillip, 178 Dorrance St., Providence
Arnold, Henry N., 42 Waterman St., Providence

TEXAS

Duerler, Alfred, 224 W. Commerce St., San Antonio
Goodnight, Chas., Goodnight

VERMONT

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Holbrook, F. C., Brattleboro

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Harris Dewitt S., Capital Landing Road, R. F. D. No. 3, Williamsburg
Keeler, Miss Grace M., Norfolk

WASHINGTON

Berg, D. H., Nooksack

WEST VIRGINIA

Brooks, Fred E., French Creek
Cannaday, Dr. J. E., Box 693, Charleston
Hartzell, D. F., Shepherdstown

WISCONSIN

Holden, Louis Edward, Beloit
Mougin, F. J., R. No. 6, Green Bay

CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association, Incorporated.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at

the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay three dollars annually, or four dollars and a half including a year's subscription to the American Nut Journal. Contributing members shall pay ten dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Article V

Members shall be sent a notification of annual dues at the time they are due, and if not paid within two months, they shall be sent a *second notice,* telling them that they are not in good standing on account of non-payment of dues, and are not entitled to receive the annual report.

At the end of thirty days from the sending of the second notice, *a third notice* shall be sent notifying such members that unless dues are paid within ten days from receipt of this notice, their names will be dropped from the rolls for non-payment of dues.

REPORT OF THE PROCEEDINGS

at the

SEVENTEENTH ANNUAL CONVENTION

of the

NORTHERN NUT GROWERS ASSOCIATION
(Incorporated)

September 14, 15, and 16, 1926

Held in the

STEVENS HOUSE

LANCASTER, PENNSYLVANIA

Chairman—President W. C. Deming

FIRST DAY—MORNING SESSION

The President: With this historic gavel, made from an Indiana pecan tree and presented to the association by Mr. Littlepage, I now call together the Seventeenth Annual Convention of the Northern Nut Growers' Association.

The program has been so arranged that the president's address is first on the program.

I ask your patience in a consideration of the past, present and future of this association and of the past, present and future of nut growing in the northeastern United States. This seems to be a good point from which to take a perspective forward and backward.

Sometime before 1910 Dr. Robert T. Morris of New York City,

who already had been studying nuts and their culture for several years, published an article in The Medical Council on "Nut Growing as a Side Line for Physicians." After reading this I wrote to Dr. Morris asking what I could do with nut growing on my New England hilltop farm of 40 acres. He replied that in fifteen years I could be getting an income of $100 an acre from nuts alone. That was just what I wanted, $4,000 a year from the farm, or from anything. So I plunged, without stopping to consider that Dr. Morris's incurable optimism might have let him to estimate my capabilities too highly. I bought every kind of nut tree that any Nurseryman had in the East. I sent to California for trees. I imported nuts from Europe for planting. I had hickory trees grafted for me in the South. Some of you know, perhaps from your own experience, what happened. First my high hopes for chestnuts were dashed by the blight. Then my Persian walnuts and pecans, under neglect, grew smaller every year, instead of larger, and finally disappeared. The filberts grew but were barren for lack of pollination. The hired man failed to heel in properly my expensive grafted hickories and they were all winter killed. The black walnut was not then highly esteemed. For several years I was not able to get a single nut bud or graft to grow. Pages could be filled with my different kinds of failure, but even then would not rival the forty-seven varieties that Dr. Morris has described.

About this time it occurred to me that other people must be having similar troubles and that we ought to share our experiences. The idea of organizing an association of such people met the approval of Dr. Morris, Prof. John Craig of Cornell University, Mr. T. P. Littlepage of Washington, Prof. C. P. Close, then of the Maryland Experiment Station, and others. On Sept. 20, 1910 I sent out the following circular letter:

> It has been suggested that it would be of value to those interested in nut culture in the North if organization could be effected and meetings held annually or oftener.
>
> Affiliation with the National Nut Growers' Association would of course be advisable.
>
> The project has the approval of Dr. Robert T. Morris of New York, Prof. C. P. Close of

the Maryland Experiment Station and others.

Suggestions as to date and place for the first meeting for organization and for topics for discussion, exhibitions, ets., are requested. Address:

Dr. W. C. Deming

Sept. 20, 1910 Westchester, N. Y. City.

As a result of this a meeting was held at the Botanical Museum in Bronx Park, New York City on Nov. 17, 1910 and organization was effected. The proceedings of this meeting were printed in the report of the meeting of the following year. Notes of this meeting, taken by Mr. Geo. Nash of the Museum, have been printed also in the report of the fifteenth annual meeting in 1924, for the second time held at the same place. The persons present at the first meeting were: Dr. Britton, Dr. Morris, Prof. Craig, Mr. Littlepage, Mr. Malcomson, Mr. Henry Hales, Mrs. Joseph L. Lovett, Mrs. Yardly, Dr. Geo. Knapp, Mr. C. A. Schwartze, Mr. Nash and Dr. Deming.

The second meeting was held at the College of Agriculture, Ithaca, N. Y., where John Craig was then professor of horticulture and where Dr. Morris's collection of the edible nuts of the world is a notable exhibit.

The third meeting in 1912, and the 10th in 1919, were held here in Lancaster, the work of Mr. Rush and Mr. Jones being then, as now, the magnets. The fourth meeting in 1913, the seventh in 1916, the eleventh in 1920 and the fourteenth in 1923 were held in Washington, D. C., where the U. S. Department of Agriculture and its staff, Mr. Littlepage's plantings, and other nut trees are the attractions. The fifth meeting in 1914 was at Evansville, Indiana to see the Indiana pecans at home. The sixth meeting in 1915 and the thirteenth in 1922 were held at Rochester, the home of the American Nut Journal, to see the Vollertsen filbert nursery, the Thompson orchard of Persian walnuts, the nut tree collections of the Rochester Park Dept. and the many Persian walnut trees grown in that favored region. The eighth meeting in 1917 was at Stamford, chiefly to visit Dr. Morris's nut orchard, which was again visited during the fifteenth convention in 1924. What should have been the ninth meeting in 1917 was never

held on account of the war. The tenth meeting was at Battle Creek, Michigan, at Dr. Kellogg's Sanatorium. And the last meeting, the 16th in 1925, was at St. Louis, chiefly to see Mr. E. A. Riehl's nut orchards at Godfrey, Illinois.

The proceedings of all these meetings have been published in separate annual reports except that of the first meeting which was included in the report of the second meeting. In these reports all the noteworthy events and accomplishments of the association have been recorded and it will not be necessary to allude to them further at this time. But I cannot refrain from referring to the great loss that the association sustained by the death of Prof. John Craig in 1912 and the notable accession to our strength in the inception of the American Nut Journal in 1914.

The object of this association, as stated in article two of the constitution, written on the date of our organization and never since openly dissented from, is "The promotion of interest in nut bearing plants, their products and their culture." This, of course, is all-embraeing.

The present of the association finds us very little different from the past. We have not notably grown in numbers nor in income. Our activities are of the same nature. We are not satisfied with everything, of course, but we are satisfied that we are on the right path. Most of us believe, I think, that our chief functions, as an association, are still to investigate and to teach. I do not think that we should, as an association, try to make it different. Individually we may strive to commercialize but collectively we should still be scientific and educational. We need feel no scruple in being social, even fraternal, as well. One of the things that we like best is to get together and talk over varieties and methods, to indulge ourselves in technical talk, and there is no reason why we should not do what we like to do. We have been told that it is time to stop talking to one another and get busy advising the public to plant commercial orchards of nut trees. But how can we do this when not one of our members can show an orchard producing real commercial results? Shall we urge the public to take risks that we do not take ourselves; or even the risks that we do take ourselves? If someone asks us, "What nuts can I plant with certainty of commereial returns, with proper known

methods, as with apples?", we may reply, "Well, plant black walnuts." When asked further, "Will the varieties you recommend bear annually, when can I expect commercial returns, what will be the yield per acre, what prices may I expect, what are the best varieties and the best market, what are the marketing methods," and so on, what can we say more than, "Well, we can give you what we think are pretty good guesses, founded on a certain number of facts." But commercial growers don't want our guesses.

We are still primitives in the art of nut growing. We have caused no upheaval in the thick crust of general ignorance about it, no emergence of a flashing beacon to guide the world. Our annual discussions are still more important and more fruitful than our public preaching. Preaching never converts the heart but education does. I have tried preaching and it has failed invariably. I have given up trying to convince anybody by sermons. Only by my works shall I conquer. The Chinese say, "One picture is worth a thousand words." We should not feel disturbed because we have not created a furor for nut growing. We can wait. We can watch a hickory grow. There is plenty of time ahead. The American people are not yet starving. Sometime it will all come suddenly to the rest of the world, that which we know and that which we believe. Even though it may not come in the life time of some of us let us label our trees with our names in enduring metal and die happy in the hope that a single variety may bear it forever.

If there must be reproaches let each reproach himself for what he has not done and praise others for what they have done, and not the reverse. Let those who would have us plant more orchards, or urge the public to plant orchards, first show their faith and ability by planting orchards themselves. Let us not try to hold others up to an undertaking that we do not ourselves venture. It is true that a number of our members have small demonstration orchards under good conditions. It is true that the late E. A. Riehl had realized some profits from his plantings, mostly from chestnuts. But not one of us has an orchard producing commercial results, nor even planned for extensive commercial results. How then can we shout to the public to plant orchards?

The matter is simple at bottom. As an association, among our-

selves, we may be radical, conservative or anything we please. With the public we must be educative but conservative. The public has reason to expect from us temperate statements not likely to mislead. We must state the truth as closely as we can. As individuals we must take the risks ourselves and when we have attained success we can lead all Missouri where it can see wealth spouting and say, "Look at this." Then Missouri will do the rest.

For commercial ends nut growing in the northeastern United States is now what it has always been in the past, dependence on our natural resources. But as an art nut culture shows progress. We now know how to grow and graft nut trees. We have rescued a number of fine varieties from extinction. We have interested some of the agricultural institutions. We have planted nurseries and experimental orchards and we are getting some nuts. Let us consider the different nuts separately. But be it understood that anything that I may now say is subject to change without notice before the close of the convention.

The Hickories

Out of the past of the shagbark hickory we have brought to light a number of promising varieties, we have used them to topwork several hundred native trees in different localities, and we have been getting a few handfuls of nuts from these for several years. We know that we may continue to topwork the shagbark hickory with pleasing and profitable results. This method may even be capable of a limited commercial extension. Nursery trees of the shagbark are not obtainable in commercial quantities. This is because of the expense of producing them, the want of success in transplanting them, and the resulting limited demand. But I think that the experiments of Mr. Bixby and others with different species of hickory as stocks for the shagbark are soon going to solve the first difficulty and give us a fairly rapid and not too expensive method of producing nursery stock in commercial quantities. As for the difficulty in transplanting, if Mr. Bixby can move twenty-four large Hales hickories from Florida to Long Island with the loss of a single tree, the solution of this problem resolves itself simply into finding out how Mr. Bixby did it.

We still know very little about the tree qualities of the different

varieties, their vigor and hardiness, their productivity and their soil adaptations.

The northern pecan hickory is a little better off in respect to nursery production in quantity, and successful transplanting, and we know more about the characteristics of the parent trees, thanks to Mr. Littlepage and his collaborators, but we do not yet know how far from their native localities, and under what soil and cultural conditions, we can recommend the Indiana and Iowa types of pecans for commercial planting. Unless there has been a change in conditions that I do not know about Mr. Littlepage's hopes for the Indiana pecans in Maryland have proved disappointing. Mr. Riehl was pessimistic about them in his part of Illinois. There is one way in which this question could be now, or very soon, cleared up, and that would be to follow up, either by a questionnaire, or better in person, the distribution of these trees in the past by the several nurserymen who have produced them. What pleasanter way to spend a vacation than, armed with a list of the customers of Littlepage and White, J. F. Jones, Ford Wilkinson and other nurseries, to drive about the country and observe the pecan and other nut trees that they have distributed?

Of the shellbark hickory we have no outstanding variety and no variety of the pignut or the mockernut in cultivation. I have long thought that we have not sufficiently investigated their possibilities.

The natural hybrid hickories are extremely interesting but we know less about them than about the shagbark and the pecan. Especially we do not know how they will go with the public as nuts to eat. Everyone knows the shagbark and the pecan but the hybrids are absolutely new nuts to the public. Therefore I think we should go a little slow in recommending them for extensive planting.

The field for artificial, man-made, hybrid hickories in the North is still a virgin one, neglected but of great promise.

There is one point on which I feel that enough emphasis has not been laid in regard to the hickories, as indeed with regard to most nuts, and that is the need for high culture and abundant feeding to get the best results. As I have observed them the hickories, and nearly all nut trees, are quite different objects in fullness and luxuriance of foliage, in rapidity of growth, and in resistance to

disease, when grown under high culture with a maximum of food supply and sunlight, than when grown under ordinary conditions in a struggle with competing vegetation or in comparative starvation. There is also evidence that nut trees under favorable conditions of nutrition are more prolific and bear larger and better nuts. When we come to think about it we recall that this rule applies to everything that grows.

Persian Walnut

The Persian, or English walnut has been grown in the Northeastern United States for over a hundred years with indifferent results due to planting seedling trees, resulting in poor or tender varieties, to lack of pollination when only one or a few trees are planted, and to poor care resulting in starvation. We have alternated between hope and despair in regard to the Persian walnut. At present many of us are in the despair stage. But my own faith has become serene. I believe that we now have, or are about to have, the proper varieties. When we understand their pollination and soil adaptations, and are ready to give them the highest cultivation and feeding, we can have success, even commercial success. I draw this conclusion from the results at my place in Redding, and from the numerous trees that I observe in Hartford, and other Connecticut towns, and elsewhere. I hope that this statement will be borne out by what we are going to see in Lancaster. But local adaptations have got to be studied. Why is it, for instance, that at Mr. Bixby's place on Long Island, under high cultural conditions, and apparently favorable climatic ones, the Persian walnut is a stunted tree, while on my New England hill without culture, although to be sure in rich soil, it grows luxuriantly and bears well? I am particularly impressed with the J. regia sinensis at my place in Redding, Conn. A follow-up of the distribution of J. regia sinensis by Nurserymen a few years ago might have valuable results. Do not let us drop the search for better varieties of the Persian walnut.

I commend to our fellows of the U. S. Dept. of Agriculture a report just received of two years' investigation by the British Ministry of Agriculture, through its agents, of the walnuts of Great Britain, with one of our members, Mr. Howard Spence of England, as judge of the merits of the nuts and trees. A similar investigation of our walnuts and other nuts by our Department of Agriculture, using the

federal and state agents, extension or otherwise, now in the field, would not seem an undertaking of unreasonable burden.

Black Walnut

The black walnut as a nut is emerging from a past of obscurity and neglect. At present we have good varieties. Better will be found or made. Its commercial value is fairly well established, at least for the extracted kernels in certain food industries, a fair number of nursery trees is available, cultural methods are fairly well known and are not exacting, it is as nearly foolproof as any nut tree and its future is a bright one. We don't know all about it, as I have said before, but it is perhaps the best tree that we can now recommend for commercial planting in a limited way and with some qualifications.

Butternut

The present neglect of the butternut is chiefly due to there being no outstanding variety better than the fairly abundant natural supply, which is enough to meet the limited demand. When those varieties we are now cultivating prove their superior merit, or better ones are found, there will be a limited field for this nut, possibly a large field on account of its generally high quality and favor with the public. On this account it might in some degree supersede the black walnut for cakes and candies.

I do not believe that the butternut tree blight, which is so bad under ordinary natural conditions, is going to be serious under conditions of high culture. I have observed many trees of large size, under these good conditions, that were luxuriant and handsome and with little or no blight injury.

Japanese Walnut

Of the Japanese walnuts the siebold type lacks a valuable representative. The heartnut varieties that we are cultivating are generally too small and some of them too tender. I think we need a larger heartnut, such as I know is in existence, in Japan if not in this country, and one with better quality, if such there is. The Japanese walnuts have been widely distributed, are very common and should be investigated. There is some doubt of their commercial value al-

though the superior cracking of the heartnut type is a great asset. The lack of character in the flavor of the kernel is the chief defect, but possibly it may develop more flavor in cooking. Mr. Hess could tell us about that. The tree, on account of its rapid growth, beauty and ease of culture, early bearing and productiveness will always be useful. These desirable qualities should be seized upon either in heartnuts of improved size and quality or for hybridizing with other walnuts.

The walnut weevil, which is so destructive in some places, I believe does not thrive except in a neglected environment.

Chestnut

The past of the chestnut is one of high faith dashed to earth by the blight. The present is an inspired battle for victory, the future a great faith in that victory. What are our forces for battle? Chiefly the experiments now being conducted by the U. S. Dept. of Agriculture with mollissima and other Asiatic varieties and their hybrids with the chinquapin. Distribution of mollissima has been made this year quite widely in quantities enough to plant from 1-2 to 3 acres and numerous smaller distributions have been made in the past eight or ten years with promising results. Hope of a conquering hero to arise from the ranks of our native chestnuts to lead us on to victory is widely held but so far with doubtful foundation. Decline of virulence and fighting power in the enemy is possible. Immunization, a la Zimmerman, is a faint hope. I do not know that high culture and intensive feeding have ever been tried with the special purpose of making the chestnut more resistant to blight. If not, it should be tried. I have European, mollissima, and Japanese chestnuts and Van Fleet hybrids bearing yearly and with no care in spite of all being blighted. I want to speak a good word for the American chinquapin. In a park in Hartford, Conn., there is a group of a half dozen bushes known to have been there over 25 years and known to me to have borne large crops every year at least for the past three or four years. One of these bushes bears a good sized nut. The chinquapin is well worth planting on the home place.

Why it is that people living on farms outside the range of the native chestnut are not tumbling over each other to plant the new varie-

ties of chestnut introduced by Mr. Riehl and Mr. Endicott, is simply because they do not know about their opportunities. Here is a chance for our western members and agricultural institutions to get busy.

Filbert

The past of the filbert is like that of the Persian walnut. Obviously, like the walnut, it is something to be desired and cultivated. But it has eluded us. The reasons are the blight and lack of effective pollination. We understand these difficulties now and the initiated can go ahead and plant filberts with assurance of experimental success and, ultimately, of commercial success. Mr. Jones' methods and new varieties are probably going to help us a great deal.

Commercial Planting

My record should acquit me of the charge of pessimism. There is no greater enthusiast about nut growing than I am. But in my blood I feel the forces both of radicalism and of conservatism working. I am not wholly the one nor the other. And I am not going to have on my conscience any precipitate advocacy of commercial nut tree planting that may lead others to loss. Mr. Corsan said he was patient and could watch a hickory grow. I can watch nut culture grow. When the boom comes I shall be delighted. I am with Mr. Bixby and Dr. Zimmerman in believing that the hickory will rival the pecan. When we can fetch into the grocery stores bushel basketsful of large, white shagbarks, all of one variety that crack perfectly and are rich and nutty in flavor, we shall command our own prices. If we haven't yet got that particular nut it will be found somewhere, or it will be bred. Our nut contests, that have been interrupted so long, and through which we have preserved so many valuable nuts, have been resumed this year under the lead of Dr. Smith and he should be enthusiastically supported by the rest of us.

Association Activities

Our secretary's nut institutes, which he has held at some of the educational centers in the West, and about which I hope he is going to tell us, should have our hearty support and imitation. I wish that we could have pilgrimages of teachers and students from our horticul-

tural institutions, pilgrimages of horticultural societies, farmers, county agents and garden clubs to Mr. Jones's, Mr. Bixby's and other of our members' places. That would spread our gospel farther, perhaps, than anything else we can do.

Mr. Snyder believes that most can be accomplished by getting our state and county fairs to put a nut list in their fair catalogues and offer special prizes to bring out new varieties. I commend this as a matter for discussion.

The old problem of funds with which to do more and better work is still unsolved. I have no solution to offer. Until some "angel" comes to back us I see no way except to go down into our own pockets. I should be glad to be one of several to pledge $25 annually for the promotion of our work. Any salary that we might at present offer our secretary would of necessity be trifling. But we should at least make it a rule to pay the expenses of the secretary in attending the conventions, and should provide him with a fund sufficient for liberal clerical expenses. I shall ask the association to act on such a resolution through the finance committee.

It has been customary to re-elect the president for a second term. I do not see any good reason for this. It is not the custom of similar organizations. One term should be enough for a president to show what he can do. A second term is a sort of anti-climax. We have done this largely because it saved the trouble of thinking up a new president. It conduces to laziness and procrastination in office (I say this without aspersion on any president of the past). If a president has but one term he will do his best at once. I wish to set a precedent and to have the honor of being the first one-term president of the association. I shall therefore decline to be a candidate for renomination.

It will probably be thought best to hold the next convention in the West. A president and a secretary from the West will then be desirable. It might be possible to hold such a western convention in conjunction with the Mid-West Horticultural Exposition at which Mr. Snyder has for several years had a noteworthy exhibition of nuts.

We are fortunate in meeting again for the third time in this pleasant city, the home until his death last month of Mr. J. G. Rush, pioneer in nut growing, and of Mr. Jones, master and teacher of all the arts of the craft. To see the maturing of the nut orchards of these men I feel is going to give us inspiration.

REPORT OF THE SECRETARY

It becomes both a duty and a pleasure to report to you at this time some of the many and varied activities of the secretary's office during the past year, September 1925-1926.

These include (1) The handling of considerable correspondence; (2) working up association publicity such as results from speaking engagements, newspaper and magazine activities and the holding of short courses in nut growing at agricultural colleges; (3) a survey of experimental projects under way by the state experiment stations; (4) the editing of the annual report and, (5) the making of arrangements for the annual meeting.

(1) Taking up in detail the duties of the secretary this past year, I would mention briefly the matter of correspondence. A constantly increasing number of letters of inquiry coming from Oregon to Maine and Texas to Pennsylvania has been handled the past year. I am especially grateful to President Deming and ex-Secretary Reed for their help in handling inquiries when I needed outside assistance. A number of new members were obtained through correspondence.

(2) Publicity. Most of my efforts along this line were at farmers' institute talks, addresses at state horticultural society meetings, before women's clubs and Rotary clubs and academies of science. These talks were given in the states of Illinois, Missouri, Iowa and Michigan. I am also working with the Illinois Nurserymen's Association in connection with the offering for sale of the better varieties of nuts. Some of the press articles published include informational material in the Chicago Tribune, American Fruit Grower, Rural New Yorker and the American Nut Journal.

One of the most important activities of the year from the secretary's office was, I believe, a speaking engagement on the Farmer's Week program at the University of Illinois and the holding of short courses in nut growing during Farmer's Week at the University of Missouri and the Iowa State College of Agriculture in January, 1926. It was only through the cordial co-operation of Prof. T. J. Talbert, head of the Department of Horticulture at Missouri, and Prof. B. S. Pickett and Prof. G. B. McDonald, head of the Department of Horti-

culture, and Division of Forestry, respectively, at Iowa that I was able to arrange for the schools. The programs follow:

Tuesday, January 19, 1926

NUT GROWERS' SCHOOL

(University of Missouri College of Agriculture and Northern Nut Growers Association Co-operating)

8:30 Possibilities of Nut Culture in Missouri—Mr. Talbert, U. of Mo.

9:30 Nut Trees on the Farm—Mr. Dunlap, State Forester, Mo.

10:30 History, Varieties and Development of Nut Culture in the Central States—Mr. C. A. Reed, U. S. D. A.

Native Persimmon Culture—Mr. Swartwout, U. of Mo.

1:30 Principles and Practices of Nut Propagation (Demonstration)—Mr. Endicott, Villa Ridge, Ill.

Essentials of Black Walnut and Pecan Culture in Missouri— Mr. C. A. Reed, U. S. D. A.

Chinquapins, Hazelnuts and Filberts—Mr. Murneek, U. of Mo.

NUT GROWERS' SCHOOL

Farm and Home Week

Iowa State College

February 2 and 3, 1926

(Iowa State College and Northern Nut Growers Association Co-operating)

There is a rapidly growing interest in nut culture in the northern states. Iowa has a wealth of valuable nut trees worthy of propagating. Other regions have desirable nut varieties which should also be grown in the state.

The following program has been arranged for the purpose of presenting the latest information on varieties of nuts suitable for cultivation in Iowa, as well as the approved methods of propagating these nut varieties. An effort has been made to secure the best available information on these subjects.

Headquarters for school, Forestry office, Room 229, Agricultural Hall.

Tuesday, Feb. 2

10:00—Room 208, Agricultural Hall.

Address of Welcome—Prof. B. S. Pickett, head, Department of Horticulture and Forestry.

10:30—Room 208, Agricultural Hall.

The history of Nut Growing in Northern United States—G. B. McDonald, head, Division of Forestry, Iowa State College.

1:00—Room 208, Agricultural Hall.

Possibilities in Nut Growing in Iowa—Prof. I. T. Bode, extension forester, Iowa State College.

2:00—Room 208, Agricultural Hall.

What Nut Varieties Shall We Grow—Mr. G. B. McDonald.

3:00 to 5:00—Room 208, Agricultural Hall.

Principles and Practices in Nut Propagation (demonstration and practice work)—Mr. F. O. Harrington, Williamsburg, Iowa, a propagator with many years' experience.

Wednesday, Feb. 3

Individual Conferences—As much time as possible of this day will be left open for individual conferences with the program leaders. These conferences will be held by appointment, and anyone with special problems he wishes to talk over can arrange for a conference at the Forestry office. It is urged that opportunity be taken to utilize this time fully and to make a personal acquaintance with the men who are studying nut culture in all its phases.

8:00—Individual Conferences.

10:00—Principles and Practices in Nut Propagation (demonstration and practice work)—Mr. S. W. Snyder, Center Point, Iowa, vice-president, Northern Nut Growers' Association, and one of the best authorities on propagation in Iowa.

11:00—Individual Conferences.

1:00—Profitable Nut Growing in the Mississippi Valley (illustrated)—Prof. A. S. Colby, University of Illinois, secretary, Northern Nut Growers' Association.

2:00 to 4:00—Individual Conferences.

Nut Exhibit—There will be on display one of the best exhibits of nuts, both native and foreign, to be seen in the United States.

The meetings were quite largely attended with a total of 200 interested students and practical nut growers present. The exhibits of nuts, propagating devices and photographs of superior trees were the cause of much attention. The discussions were lively and helpful to those present. A number of memberships were secured and the way paved for other such meetings in the future.

In this connection the activities of J. F. Wilkinson of Rockport, Indiana in urging the formation of a local branch of the association are to be encouraged. Only through the formation of small groups, able to come together after the nut harvest, for example, and discuss their problems, can the larger association, scattered over such a large territory, function satisfactorily.

(3) In an effort to determine what the different state experiment stations were doing with the promising new field of nut culture I

attempted a survey. While many reported that they were interested they stated that other horticultural activities were deemed more important and were absorbing all available funds at present. Some of the projects under way include:

Missouri: Hybridization of the filbert.

Minnesota, New York, Iowa, Tennessee and Illinois: Adaptability of nut species and varieties.

Oregon: The survey and collection of superior English walnut seedlings; pollination of the filbert.

New Jersey: Studies in blight resistant chestnut varieties.

Indiana: Tentative plans to top work hickory and walnut seedlings as a variety test.

Maryland: Bulletins 125 and 218 give reports of nut tree growing investigations in the state.

Michigan: Collection of hardy nut varieties. Studies leading to the doctor's degree on fruit bud differentiation in the pecan and fruit setting in the pecan. Certain phases of the walnut grafting problem to determine the influence of different nutrition conditions on the callousing process are being studied by another graduate student.

California: Extensive fertilizer treatments with walnuts, variety tests, studies on the control of walnut rosette, root stock investigations with different strains of juglans especially with reference to crown rot, studies on the bleaching, curing and harvesting of nuts, and investigations on the control of codling moth and other insect pests in walnuts.

I also wrote to each of the state vice-presidents regarding conditions locally. Very few replied. R. H. Turk of Washington, responded with brief notes of interest. The following are among the replies received:

Charleston, West Virginia,

August 14, 1926.

Relative to the situation in this state, there are many good black walnut trees, and these, as a rule, bear regular annual crops. The native hickories here do not seem to do very well, that is as a rule they are shy bearers. I understand, however, in the higher altitudes such as occur in Greenbrier, Pocahontas, Randolph, Harding, Nicholas,

and a few of the other more upland counties that the hickories bear full crops.

There are a very few pecan trees in this state, none of them native and I do not know of any that produce enough pecans to amount to very much.

The chestnut blight has gotten fairly well established throughout most of if not the entire state and is beginning to show up rather extensively in our forests.

Native hazels bear fairly well. The European hazels that have been tried out in this section have not done very well owing, I think, to the many and very sudden changes of temperature during the winter months.

The forests through this section are made up to a great extent of beech trees. They bear a great many nuts but these are too small to be of commercial value at the present time.

JOHN E. CANNADAY.

Council Grove, Kansas,

August 16th, 1926.

Regarding the nut situation in Kansas wish to say that we have had three very dry years and my forty grafted pecans have practically no growth. My chestnut trees are about all killed with the drouth, the most severe in a half century. This climate is suitable for northern pecans if the weather is seasonable.

I have a number of grafted black walnuts (5 varieties). Some of these are bearing. I believe that Thomas is the best. So far the McCoy bears heavily but the nuts are not as large or as easy to crack.

I have a Burlington hican grafted on pecan which is the best grower on the place. It stands extremes of weather. I grafted it from a tree secured from Snyder Brothers. I think the Iowa trees are best for our climate.

I have an English Walnut six years old which was about ready to bear when a freeze on the 28th of last October killed the crop. Our air is too dry in Kansas to grow English walnuts. Winter killing follows. The English walnut to stand much cold must have a moist air.

JAMES SHARPE.

Salem, Oregon,
8-18-26.

Your letter asking for report on nut growing conditions in this section at hand. I regret that I will be unable to attend the meeting of the association this fall.

Our western nut association recently held a two-day field trip among the filbert and walnut orchards in the southern part of our nut section. A study was made of various cultural practices, types of pruning, soils and sites. Large crowds of enthusiasts attended the meeting.

The filbert orchards this year have the largest crop on record. Four and five-year-old trees are loaded. The walnut orchards have an average crop.

Ten years ago walnuts occupied the center of the stage here and filberts received but passing notice. The interest in walnut growing and the amount of planting has not decreased but that in filberts has so increased that that crop is now taking the center of the stage.

KNIGHT PEARCY.

England,
23-8-26

Many thanks for your letter of the 11th inst. Nothing would give me greater pleasure than to be able to attend the association's annual meetings sometime. I hope it is only a pleasure deferred and that some day I will be able to make a trip to the U. S. coincident with the autumn gathering.

I have just sent to Dr. Deming a report showing how we stand in this country and the difficulties to be overcome. Perhaps some point in this may be of interest even though our difficulties are not the same as yours.

HOWARD SPENCE.

NUT TREE NOTES—VIRGINIA

September 8, 1926

But little interest is manifest in the subject of nut tree growing in Virginia. There are in and about Williamsburg several pecan trees of large size, evidently dating from the days of Thomas Jefferson. These trees are fruitful and bear small sized nuts of good quality. But no one has seen fit to plant trees until within the last few years.

I have trees in bearing of the Stuart, Moneymaker, Mantura, and Carman varieties. Of these I regard Moneymaker as the only sure cropper of Virginia. I have several northern varieties growing but not in bearing.

Filberts grow well here but trees are not old enough to bear. The filbert is attacked by the larva of a butterfly which may be controlled by a spray of lead arsenate.

It is uncertain about the Persian walnut being profitable in this section. I have several varieties growing but they give little promise as yet. I know of two seedling Persian trees in this section which are fairly fruitful and the nuts are of good quality, but grafts from these trees have not proved very fruitful.

Ten years ago I set some pecan buds in hickory stocks (bitternut). They have grown well but bear very few nuts. One had better cut out the hickory trees and set grafted pecan trees. In ten years the grafted pecan trees will be bearing good crops of nuts.

Two years ago a lady in this section decided to start a pecan orchard. I did what I could to get her to purchase northern grown trees but she purchased trees from Mississippi because they were cheap. She set one hundred ten trees. The first winter about one-half of them died outright, the others sprouting from below the graft. The second spring the man to whom she rented the place plowed up the whole business. Thus endeth the first chapter.

Black walnuts are indigenous to this section and grow rapidly and bear abundantly. I have the Thomas and the Stabler varieties growing and bearing. From present prospects I believe that black walnut growing offers more inducements as a commercial proposition, in this section, than any other nut tree.

The butternut also grows well here but the trees are subject to a

fungus disease which attacks the roots and kills the trees before they reach profitable bearing age. D. S. HARRIS.

In conclusion, I will say that I regret my inability to continue longer as secretary. My regular work prevents me from undertaking any more outside activities. I have, however, appreciated the spirit of co-operation exhibited by the officers past and present when I asked their help, and hope that the incoming secretary will be able to spend more time on association matters than I. In this way the association can increase its membership and influence. As we can point to bearing trees and bearing orchards our membership will take care of itself.

We need to keep in touch with the experimental work being done by experiment stations and individuals, to lose no opportunity to plant demonstration trees in arboretums such as the Morton Arboretum at Lisle, Illinois, and the projected botanical garden at Strawberry Hill near Stamford, Conn., and in city parks and other public institutions, and to use every opportunity to desseminate information relating to the culture of nuts in the northern United States.

A. S. COLBY,
Secretary.

The President: Any one who has been secretary of an organization similar to ours can appreciate the amount of work represented by the report our secretary has given us this morning. The thing that strikes me of greatest value is the increase in the number of public institutions who are taking an interest in nut growing. When we organized there was hardly an institution, college or agricultural experiment station that was taking an active interest in nut growing. Year after year we have seen gradually a few more of these institutions becoming interested and now I think that our secretary's report shows that they are coming in in geometrical progression. That to me is the most important thing that I see in the present status of nut culture, the interest of the great educational agricultural institutions of the country.

TREASURER'S REPORT

From Sept. 1, 1925 to Aug. 31, 1926, both dates inclusive

CREDITS

Loss & Gain *from previous fiscal year (on Sept. 1, 1925)	$347.85
Membership Plan No. 6	139.50
Membership Plan No. 9	8.25
Membership Plan No. 11	187.00
Membership Plan No. 12	2.75
Contributions	11.75
Contributing Memberships	20.00
Sales of Literature	10.50
Interest	.20
Banqueting Receipts, St. Louis	115.00
Nut Prize Fund	150.00
	$992.80

*This item includes deposits $340.83, $4.43 and cash $2.59.

DEBITS

Middletown National Bank, Deposit		$483.62
Litchfield Savings Society, Deposit		14.63
Cash on Hand		4.23
Expenses, General, 16th Annual Convention:		
Reporting Convention	$ 75.00	
Banquet, 46 covers at $2.50	115.00	
Banquet, 3 covers complimentary	7.50	
250 Badges	30.00	
Tel., Tel., Baggage & Porters' fees	8.26	
Printing 2000 Letterheads		13.00
Printing 1500 Envelopes		11.00
Printing 500 Government Postal Cards		3.75
1000 Record Cards		6.00
1250 Programs		20.00
Mailing Programs		11.00
750 Letters		8.50
600 Receipt Forms		8.50
Stenographic Services		112.80
Dictation and Typing		6.90
Two Cent Stamps Sent to President		4.00
Two Cent Stamps Sent to Secretary		25.00
Postage and Registry		1.06
Registry Fees		1.08
Postage on Annual Reports Sent		.19
Government Envelopes		.24
Postal or Post Cards		5.75
Telegrams		2.99
Expenses, Nut Prize Fund:		
Typing and Mailing Letters	$7.80	
160 Stamped Envelopes	3.50	
90 Copies 1 Stencil Cut and Run	1.10	
Postage	.40	
		12.80
		$992.80

At the time of last report we owed $10.50 for the Nut Journal which fact was shown in the report.

$150 was collected for Nut Prize Fund and is not available for general purposes.

Printing and mailing of 16th Annual Report (1925) was paid for in October, 1926, and will appear in next report.

In this report I have used the words Credits and Debits as they seem more proper than either Liabilities and Assets or Receipts and Expenditures. Assets give the impression of property. Expenses hardly come under that head. Bank deposits and cash on hand do not come under the head of expenditures. Debits and Credits cover them all properly.

H. J. HILLIARD, Treasurer.

THE PRESIDENT: We will not discuss the reports at this time but if anything is to be said about them it will be taken up at the business meeting to be held tonight.

THE SECRETARY: Nominations for the Nominating Committee to name officers for the ensuing year are now in order.

Mr. W. G. Bixby, Mr. T. P. Littlepage, Mr. R. T. Olcott, Mr. Zenas H. Ellis, and Mr. Karl W. Greene were nominated and elected.

THE PRESIDENT: I will appoint Mr. Neilson, Mr. Littlepage, and Mr. Olcott as the committee on resolutions.

Afternoon Session

TOPWORKING WILD NUT TREES

By Dr. Robert T. Morris, Connecticut

There are so many wild nut trees in this country and these older trees come into bearing so much more quickly than nursery stock that substantial income will be derived by owners of such trees if they graft them over to superior kinds.

Topworking means a great deal of labor and attention but the promptness of results stands in its favor. It is possible to topwork large trees more than a foot in diameter of trunk. For the most part, however, successful topworking will belong to nut trees of less than one foot in diameter. I have tried out various degrees of cutting back of tops and have made about the right proportion of mistakes in judgment.

If we cut back the top of a tree too severely the root system is not properly nourished and the natural balance between top and root may not be regained for several years .

If we cut back a top too severely the ends of limbs more than three inches in diameter are very vulnerable to agencies of rot. This is also true of limbs of less than three inches in diameter unless all cut ends are carefully painted with an antiseptic paint or with melted paraffin.

If we cut back a top too severely the grafts will make such a tremendous growth that they will all blow out in a high wind unless elaborately braced with supports.

Now comes the other side of the question. If we do not cut back the top of a tree severely, new stock sprouts will start out in such abundance from all of the limbs that are left that it means going over the tree two or three times in the course of a week in the growing season to keep stock sprouts plucked out. If this is not done their enzymes will destroy the graft sprouts, apparently. If the tree is deprived of the advantage of stock sprouts its root does not receive a proper degree of nourishment until graft sprouts have supplied the need.

In former papers I have described experience in grafting limbs that were cut back for topworking purposes. I described the distal bark slot and the proximal bark slot for receiving grafts. My whole feeling in this regard has now changed. The proximal bark slot may be employed to advantage at many sites on trunks and limbs but the distal bark slot on the end of a cut branch I no longer use. Instead of that I cut off a limb near a small branch, paint the cut end of the limbs and then put on anywhere from one to half a dozen grafts on little branches belonging to this small branch. This allows us to use the ordinary splice graft or cleft graft upon stocks of approximately the same diameter as the grafts. This point will be appreciated by everyone experienced in grafting. The nearer we can come to having the diameter of the graft equal that of the stock the better our results in getting catches. Topworking in this way means the use of a very large number of grafts for any one tree. When our supply of grafting wood is limited we may cut out simply part of the top of a tree suitable for whatever number of grafts we have. Graft wood may be employed more economically now that we are using a method of covering the graft entirely, buds and all with melted paraffin or other suitable melted grafting wax. This method of covering each graft with a waterproof coating avoids the desiccation or drying out of the graft which in former years made it necessary to use grafts carrying a number of buds. At the present time by this new method we may use very short grafts carrying only one bud if we wish for economy of material.

I now give the audience a demonstration of topworking method using a hickory limb about three inches in diameter which has been cut off at a point leaving a small branch one-half inch in diameter. This small branch has three little branches about the diameter of my scions. The little branches are cut off at a point where the diameter will correspond with the diameter of the scions which are now inserted by simple splice method or by simple cleft method.

We have learned of late that it is very important to shade scions after they have been inserted. Some nurserymen have reported that they obtained nearly one-hundred percent of catches where each graft was protected from the sun with a slip of paper or a paper bag until its sprout were well under way. When leaving a certain number of other grafts unprotected from the sun experimentally, they did not get more than twenty percent of catches. This experimental work

showing the great difference in proportion of catches between shaded and unshaded grafts is very significant. We must all go to shading our grafts until the new graft shoots are well out. The shading is then removed. This means a great deal of trouble but it works and anything which works is profitable; that is the main point.

Now that I have shown the method of topworking by using small branches I will again give a demonstration of the proximal bark slot which may be employed for bare limbs or even for trunks. I make a transverse cut through the bark down to the wood. Above the transverse cut I take out a generous slice of bark which will expose the wood. Below the transverse cut I make two parallel cuts, the width of the scion. The bark between these two parallel cuts is turned down, the scion inserted and the tongue of bark is replaced, all being fastened with turns of raffia.

Mr. Rick: Are the scions ever larger than the stocks?

Dr. Morris: Yes. The essential thing is to get the cambium layers in contact on one side at least. Experimentally I have put on a scion four or five times larger than the stock. For grafting purposes in topworking you have to use a great many scions but you can use economy in the matter. There is a requirement for a large amount of scion wood. In the paraffin method you do not need so much wood. You can cut your scions pretty short. The short ones grow just as well as the long ones if they are paraffined, otherwise not.

Prof. Neilson: Allowing for the proper cambium contact, the bud must be in line with the contact?

Dr. Morris: That may be important, although it will grow upside down.

Mr. Green: You put the bud in right in line with where it joins the cambium?

Dr. Morris: I do not believe it makes vital difference because the flow is doing a spiral course in a way. The sap has to follow the spiral order of buds, consequently I assume that a short spiral or a long one would not make much difference. If I put this graft in upside down it will grow just as well as if I put it in right side up.

About the amount to be cut back in top-working trees. That I have

experimented with pretty extensively. Let us begin at the bottom and say that a tree about a foot in diameter is cut off close to the ground with the idea of putting in scions. As a rule they do not do well that way. Your root is not being supplied with the proper amount of nourishment, and because the root is not getting enough it will send out abundant stock sprouts. It is not practical. Scions will grow, but you will have to keep stock sprouts cut down so closely that roots will not get proper nourishment.

Let us say we have cut off a tree, the top of it, so that we have limbs from 1-2 in. to 4 in. in diameter, and try the bark slot. That is better than cutting the tree down and starting from the base.

Suppose we trim back a tree only a short way from the top, leaving most of our branches from one-half inch to two inches in diameter and then graft these little side sprouts. You quickly get a balance between the top and the root and the top is able to maintain the balance, and the tree will start off in the proper way.

Mr. Green: Would you leave any branches to maintain this balance?

Dr. Morris: Yes, that may be done, leaving some branches to maintain the sap for the root. That "sap leader" however is a thing I have experimented with to great length, and I have about come to the conclusion that the sap leader idea that is held so firmly by many horticulturists is of no great value. At the present time, except experimentally, I am not leaving sap leaders on the tree. When your scions have grown out very well, say several inches long, sometimes then it is very well to leave stock sprouts for foliage. In that way you are more sure to get nourishment for the root, and another advantage is that your scions will not overgrow to such an extent that there is danger of their blowing out.

Mr. Walker: Dr. Morris mentioned cutting back the tree previous to grafting. How long previous to grafting?

Dr. Morris: It is better to cut it back before the sap starts in the spring—in this locality February, or you may do it as soon as the leaves turn yellow in the fall. There is a difference of opinion about the time. Some prefer cutting back as soon as the leaves turn in the

fall and others in February or spring, while the tree is still dormant. The cut limbs must be protected with paint or wax to keep out bacteria or fungi. I have tried cutting back at various times in the year. I have cut back in August and the trees did well.

Mr. Neilson: What is the actual temperature that buds will stand when covered with paraffin?

Dr. Morris: I have found that 200 F. was borne by all except peaches. Not much above 150 F. is entirely safe.

Mr. Rick: Would you prefer to do most of your grafting when the foliage is not out and the tree is still dormant?

Dr. Morris: I am speaking from an experimental standpoint largely. It depends upon several questions. The kind of tree and amount of sugar in the sap. If dealing with walnuts it is better to wait until they are almost in full leaf and the leaves pretty well formed. They are grafted through June, or late May to advantage. There are other ways of controlling that flow. We will ask Mr. Jones to tell us about that. He is the one best qualified to speak. We have grafted hickories every month in the year.

Mr. Bixby: You speak of grafting hickories every month in the year. They have been successfully grafted every month in the year?

Dr. Morris: Oh yes, that is a point. Success is a relative term, however, and we must ask if they are grafted practically for the orchardist instead of successfully as an experiment. They have been grafted so that they have grown, but the proportion of catches is smaller some months and larger in other months. The proportion of catches is best during the months horticulturists have always recognized as the best—the spring months.

The President: You say that the enzymes from the new stock growth kill the graft sprouts. That is only true of the new growth?

Dr. Morris: It seems that the new stock growth is specially inimical to grafts. When the old foliage is trying to exercise supremacy over graft sprouts it does not seem to furnish enzymes that are so deadly to grafts.

Dr. Smith: Have you any objection to partial topworking of walnuts? One limb?

Dr. Morris: I am afraid your established top would take advantage and not allow grafts on one limb to grow. That is not true of apples however. I have grafted a single apple limb in a full foliage tree and grafts all grew. With the nut trees or hardwood trees I think it would be rather risky. I tried that and did not get good results.

Dr. Smith: How many grafts would you have to a large tree?

Dr. Morris: In a tree 30 feet high you would have to use more than 100 grafts but you will get your new top started right off. It pays because you will have a full crowned tree more quickly.

NORTHERN NUTS—VARIETIES

Willard G. Bixby, Baldwin, N. Y.

In opening this subject I cannot resist saying a word about the purpose for which we are seeking fine varieties of nuts, i. e., that of getting orchards of them planted and bearing; and giving a few general observations which apply to all nuts, or to a species, as well as information regarding individual varieties.

The establishment of a commercial nut orchard was the subject of an address by Mr. Thomas P. Littlepage before the Washington convention of the Northern Nut Growers Association in 1923. He started in with faith as the first requisite and while, in due course, he dwelt on hope and charity it is faith that is the first requisite; that is, believing that the promises shown by results in small experimental plantings will be borne out in larger ones.

A remark by Judge Edwards at the Austin, Texas, meeting of the National Nut Growers Association is something I have never forgotten. He said that he had a great admiration for what the Northern Nut Growers Association had done with the stubborn material with which they had to work; that in the south all that had been done was that a few men had planted pecan nuts and from them had grown fine varieties; and that one had little to do other than to look around and select the treasures that God had provided; while in the North they even had to breed varieties, in some instances, to get what they wanted; and that, while propagation in the South was easy, it had taken years of work by experts to accomplish it in the North.

It is only fair to say however, that the contrast between the pecan nuts of the South and the native hickory nuts found there is tremendous, and I can well understand why Judge Edwards was impressed as he was. In spite of the fact that the northern hickories, so far as I have seen, offer much more promise to the nut grower than the southern ones do, nevertheless it is true that nut growing in the North has had much more to overcome than it has in the South.

It is over fifty years since the first fine variety of northern nuts that we have (the Hales hickory) was brought to the attention of the

agriculturists of the country. Attempts to propagate it were failures for some twenty years. While now propagation, in the case of most nuts, has almost been reduced to a certainty, provided good material is used and skilfully handled, yet nut growing in the North is far from being on the profitable commercial basis which we all believe it is destined to reach.

As a class the nuts which promise best are those that are native to what might be called the middle northern sections. The nuts of the more northern sections are seemingly not as well adapted. In this respect nuts are like fruits. Chestnuts (where they are not subject to attack by blight) and black walnuts have demonstrated in a small way that they will pay well when planted in orchards. Other nuts are promising. The important thing to do now is to plant orchards of these species that have been shown to be successful in a small way and try out the others that promise well.

The species about which we know most as to behavior in orchard form are the black walnut and the chestnut. At Alton, Ill., on the place of the late E. A. Riehl, on land too steep for ordinary cultivation, these have proven more profitable than the rest of the farm. The heartnut at my place (all varieties) for years has been bearing constantly increasing crops and is giving promise of success.

Nuts want rich soil. If it is not so naturally it must be made so if best results are to be obtained. Seemingly land cannot be too rich for nut trees.

The question of annual or biennial bearing has been raised as to varieties. While various conditions do make a difference in bearing, so far as I have observed at Baldwin, nut trees if given plenty of plant food seem to bear annually, barring unusual conditions. For example, black walnuts have shown increasing crops until the year 1926 when the crop is nothing except on the Royal and McCoy varieties. The hazels also are bearing very light this year. On the other hand, the Persian walnuts have borne as never before. Last winter it should be said was one remarkably free from sudden changes in temperature, a condition which I expected would be favorable both for the Persian walnut and the European hazel. It was for the Persian walnut but seemingly not for the European hazel.

The matter of which varieties to plant is one on which much might

be said although there is less known than we wish were the case. What follows is an attempt to note what we know as to varieties in the hope that it may form a nucleus for the additional information that will come later.

Almonds

Almonds are perhaps more exacting in climatic requirements than any other nuts and the experiments made do not as yet give much hope of almonds being commercially successful outside of the almond sections.

Varieties:—

Ridenhauer—The one variety which seems to do well outside of almond sections. The shell looks like that of a peach kernel but the flavor is good. Probably an almond x peach hybrid. Bears early and abundantly.

Beech Nuts

These nuts although as thin shelled as chestnuts are more like the hard shelled nuts in other respects. The flavor is generally fine and the nuts are rich in oil and the only drawback is their generally small size. This is a nut which thrives in northern sections where most fine nuts do not.

Varieties:—

Abrams (formerly Giant)—Parent tree in Martinsville, Ind.

Abundance—Parent tree in Martinsville, Ind.

Black Walnuts

The most promising nuts for commercial planting in the northeastern United States. The trees are heavy bearers and the kernels sell at prices above those paid for Persian walnut kernels. A reasonable amount of summer heat is needed for the proper development of the nuts.

Varieties:—

Adams (Iowa)—Parent tree in Monona County, Iowa. Noted in 1924 report Iowa State Horticultural Society.

Adams (Michigan)—Parent tree in Scotts, Kalamazoo County, Michigan. Shape distinctive being longer in proportion to its diameter than any other propagated variety.

Alley—Parent tree in Lagrangeville, Dutchess County, N. Y. Probably the most northerly growing black walnut now being propagated.

Deming—Parent tree in Winnipauk near Norwalk, Connecticut. Leaves and young shoots distinctly purple, cambium layer brown, husk of nut purple, flavor of kernel very mild and tasty. There are two trees with these characteristics near together, one an old tree and one young.

Glory—A variety with curly wood and valuable for timber purposes.

Herman—Parent tree dead. Formerly native of Lancaster Co., Pa. Formerly called the Rush black walnut.

Hine—Parent tree in Des Moines Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Jumbo—Parent tree in Des Moines Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Kinder—Parent tree in Indiana. Propagated by McCoy Nut Nurseries.

Lamb—A variety with curly wood, valuable for timber purposes.

Lewis—Said to be an excellent cracker.

Lutz—Parent tree in North Carolina. One of the largest propagated black walnuts.

Mattingly—From Rockport, Indiana.

McCoy—Parent tree in Indiana. Brought to the attention of the Association by R. L. McCoy.

Miller—Parent tree in Indiana. Propagated by McCoy Nut Nurseries.

Morris—Said to be an exceptional cracker.

Ohio—Parent tree in McCutchenville, Ohio. Nuts took first prize in one of the Northern Nut Growers Association contests. Next to the Thomas and Stabler this variety has been most largely propagated.

Paradox—A hybrid—Juglans hindsii x regia made by Luther Burbank at Santa Rosa California where it is a very rapid grower and it has been recommended by him for timber purposes. At Baldwin it is not of specially rapid growth. It blossoms plentifully but so far has borne no nuts.

Peanut—Parent tree in South Salem, Ohio. Noted in Bulletin U. S. Dept. Agriculture 1896 as filling on one side only which makes kernel in one piece. Apparently not all of the crop in this way.

Pearl—Parent tree in Linn Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Royal—A hybrid Juglans hindsii x nigra, made by Luther Burbank at Santa Rosa, California where it is a very rapid grower. It has been recommended by him for timber purposes. At Baldwin it grows no faster than the Thomas black walnut. It bears large crops which do not rank high compared with the best varieties which we have.

Schwartz—Parent tree in Des Moines Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Stabler—Parent tree near Brookville, Howard Co., Md. Tree is a large one and a vigorous grower. The crop in 1916 was about 18 bushels of hulled nuts. The foliage is distinctive being drooping in character different from all other varieties. This variety bears part of the crop with the kernel in one piece, i. e., half of the kernel has failed to develop. This makes this variety far ahead of all others in cracking quality. Mr. Thomas P. Littlepage, Lloyds Station, Maryland, has the largest planting of this variety.

Ten Eyck—Parent tree in Rahway, N. J. Tree is a young one, probably being under 25 years old. Has the smallest husk and the thinnest shell of any variety so far known. One of great promise for planting.

Thomas—Parent tree dead, formerly in King of Prussia, Pa. The earliest propagated black walnut and the one most extensively planted. The late E. A. Riehl, Alton, Ill., was the first to make extensive plantings and he regarded it as of great promise commercially.

Wasson—Parent tree near New London, Ia. Brought to the attention of the association by the late Wendell P. Williams.

Woodall—Parent tree in Milford, Delaware. Said to be a very prolific bearer.

Butternuts

These are more northerly growing than black walnuts and it is hoped that they may in the colder sections take the place of black walnuts.

Varieties:—

Aiken—Parent tree in Grasmere, N. H. Tree large and vigorous. The first propagated butternut, exceptional cracker.

Buckley—Parent tree in Clayton Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Deming—Parent tree at Georgetown, Conn. Took first prize 1918 contest.

Sherwood—Parent tree in Des Moines Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Saugatuck—Parent tree in Redding, Conn.

Chestnuts

These are strongly recommended for commercial planting in sections where the chestnut is not native but where it will grow and bear well. This applies to quite a portion of the middle west. Chestnuts bear young and prolifically and fine varieties bring high prices. In planting be sure to get trees from sections where there is no blight.

Varieties:—

Boone—A Japan x American hybrid originated at Villa Ridge, Ill.

Champion—Originated by E. A. Riehl, Alton, Ill.

Fuller—Originated by E. A. Riehl, Alton, Ill. One of the best varieties.

Paragon—A variety of the European chestnut; a late variety; bears prolifically.

Progress—Originated by E. A. Riehl, Alton, Ill.

Rochester—

There are many other varieties that have been recommended for propagation.

Hazels

These are considered of great promise at the present time. The bush or tree is a northern growing one and the native hazel generally bears prolifically. The problem is apparently to get the right varieties. Earnest attempts are now being made to breed those that shall prove better than existing ones although we have some of great promise.

Varieties:—

Barcelona—The standard market variety of the Pacific Coast.

Daviana—A fine variety.

DuChilly—A standard market variety.

Geant des Halles—A fine variety.

Imperial—A fine variety.

Italian Red—A variety from Erfurt, Germany; winter kills in some places. A fine variety.

Merribrooke—From Stamford, Conn. Next to the Rush the best native hazels so far found.

Merveille de Bolwiller—From Erfurt, Germany. A fine variety.

Noce Lunghe—A fine variety.

Red Aveline—A fine variety formerly marketed to quite an extent but discontinued because of its small size.

Red Lambert—A fine variety from Erfurt, Germany.

Rush—From Lancaster, Pa. A variety of American hazel large enough to be marketed.

Winkler—Parent bush in Des Moines Co., Ia. Nuts the largest of any pure American hazel yet found.

White Aveline—A fine variety formerly marketed to quite an extent but discontinued because of its small size.

White Lambert—A fine variety from Erfurt, Germany. One of the best.

There are many other European varieties that have been planted to some extent in this country.

Heartnuts

These are sometimes called smooth shelled butternuts. They are native of Japan. They bear young and prolifically and give promise of being of commercial importance.

Varieties:—

Bates—Parent tree in Jackson, S. C.

Faust—Parent tree in Bamberg, S. C.

Lancaster—Parent tree near Lancaster, Pa. Tree vigorous and bears prolifically. The variety that has been propagated most largely. Winter kills in exposed locations.

Ritchie—Parent tree in Virginia.

Stranger—Parent tree in Jackson, S. C.

Hickories

They were the first northern native nuts to be propagated by grafting but they are today the nuts on which our knowledge of behavior under orchard conditions is the most meagre. There are some 15 species native in the United States and the number of varieties is large and growing.

Like the wood and the shell which are proverbally hard the hickory

has proved hard in getting into orchard conditions. Growing of grafted trees in the nursery presents a number of difficulties and the grafted trees are difficult to obtain. A number of the fine varieties of hickories that we have will undoubtedly sell at about the prices paid for fine pecans as soon as they can be produced in commercial quantities.

While grafted hickory trees are difficult to obtain and difficult to transplant and get established, there is much promise in top working young hickories to fine varieties especially where they are growing on rich land or on land that can easily be enriched.

In top working care must be taken to put the proper varieties on the various hickory species. All is not known about this that is to be desired yet we know much more than we did a few years ago, for systematic attempts have been made to graft the most commonly occurring hickory species with the best known varieties and note the results over a series of years. While these experiments are far from complete a few general laws have been observed.

1—Generally a hybrid variety will do well on either parent.

2—Most varieties do pretty well on the pecan and on the shagbark. Most do well for a few years at least on the bitternut although some varieties do not do well later.

3—The varieties that do well on the pignut and the mockernut are limited being so far seemingly restricted to the Brooks on the pignut and the Barnes on the mockernut. It is hoped that this number may be enlarged later.

Varieties:—

Barnes—Parent tree at Fayetteville, O. A fine variety doing well when grafted on mockernut. Apparently a shagbark mockernut hybrid.

Beam—Parent tree in Mt. Oreb, O.

Beaver—Parent tree near Millerstown, Pa. A shagbark x bitternut hybrid of much promise.

Billau—Parent tree in Linn Co., Ia.

Brooks—Parent tree in West Virginia. A fine hickory doing well when grafted on pignut.

Casper—Parent tree in Illinois.

Cedarapids—Parent tree near Cedar Rapids, Ia.

Clark—Parent tree at Ludlow, Mass. Took first prize 1918 nut contest.

Dennis—Parent tree near Cedar Rapids, Ia. Named for the late Dr. A. B. Dennis who brought it to the attention of the association.

Edaburn—Parent tree in Benton Co., Ia.

Eureka—Parent tree in Des Moines Co., Ia. A shellbark. Noted in 1924 report Iowa State Horticultural Society.

Eversman—Parent tree in Des Moines, Ia. A shellbark. Noted in 1924 report Iowa State Horticultural Society.

Fairbanks—Parent tree near Anamosa, Iowa. A shagbark x bitternut hybrid of much promise.

Glover—Parent tree in Shelton, Conn. One of the best cracking hickories yet found.

Grupe—Parent tree in Linn Co., Ia.

Hagen—Parent tree in Clayton Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Hales—Parent tree now dead, formerly at Ridgewood, N. J. The variety that has been propagated longest. About one dozen grafted trees on the farm of the late Henry Hales, Ridgewood, N. J. have been bearing for a number of years.

Hand—Parent tree in Linn Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Hill—Parent tree in Des Moines Co., Ia. A shellbark. Noted in 1924 report Iowa State Horticultural Society.

Iowa—Parent tree in Des Moines Co., Ia. A shellbark. Noted in 1924 report Iowa State Horticultural Society.

Kelsey—Parent tree in Linn Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Kentucky—Parent tree at Meeting Creek, Ky. Apparently a shagbark x mockernut hybrid, a variety of much promise.

Kirtland—Parent tree in Yalesville, Conn.

Laney—Parent tree in Rochester, N. Y. A shagbark x bitternut hybrid of much promise.

Leonard—Parent tree in Middletown, N. Y. Shell, thin; quality, high; size, small.

Manahan—Parent tree in Sabillasville, Md.

Milford—Parent tree in Milford, Mass.

Minnie—Parent tree in Linn Co., Ia. Noted in 1924 report Iowa State Horticultural Society.

Pleas—A pecan x bitternut hybrid from Oklahoma.

Reike—

Sayer—Parent tree in Des Moines Co., Ia. A shellbark. Noted 1924 report Iowa State Horticultural Society.

Shaull—Parent tree in Iowa Co., Ia. Noted 1924 report Iowa State Horticultural Society.

Schinnerling—Parent tree in Iowa Co., Ia. Noted 1924 report Iowa State Horticultural Society.

Siers—Parent tree in Lawrenceburg, Ky. A hybrid (mockernut x bitternut?) of much promise.

Stanley—Parent tree in Carthage, Ind; a shellbark.

Stratford—Parent tree dead, formerly in Hamilton Co., Ia. Noted 1924 report Iowa State Horticultural Society.

Swaim—Parent tree in South Bend, Ind.

Tama Queen—Parent tree in Des Moines, Ia. A shellbark. Noted 1924 report Iowa State Horticultural Society.

Taylor—Parent tree in Stamford, Conn. Thin shell, fine flavor.

Vest—Parent tree in Blacksburg, Va. The variety with the thinnest shell known and with particularly fine flavor of kernel. It has taken first prizes more times than any other variety. Generally considered to be the best variety yet found.

Wampler—Propagated by W. C. Reed, Vincennes, Ind.

Weiker—Parent tree near Lancaster, Pa. Said to have been one of the original forest trees spared when the land was cleared 200 years ago because of the fine nuts it bore. Crop 1916, 12 bushels, and usually bears several. Thought to be a shagbark x shellbark hybrid.

Pecans

These are botanically one of the hickories and are properly called pecan hickories but the popular name "pecans" will be used here simply. They are an important commercial crop in the South but the southern varieties are not adapted to northern planting. Apparently a considerable amount of summer heat is necessary for the proper maturing of the nuts of even the northern varieties although the northern pecan will stand much winter cold.

Varieties:—

Burlington—Parent tree near pumping station, Burlington, Ia., waterworks. Pecan x shellbark hybrid.

Busseron—Parent tree in Busseron Township, Knox Co., Ind. One of the earliest bearing varieties.

Butterick—Parent tree near Grayville, Ill.

Des Moines—Parent tree in Des Moines Co., Ia. Blown down in 1924. Noted in 1924 report Iowa State Horticultural Society. Evidently a pecan x shellbark hybrid.

Greenbay—Parent tree near junction of Skunk River with Mississippi, Des Moines Co., Ia. A pecan x shellbark hybrid.

Greenriver—Parent tree in Henderson Co. Kentucky. Said to be regular and heavy bearer.

Indiana—Parent tree in Busseron, Township, Knox Co., Ind. Said to be regular bearer and heavy cropper.

Major—Parent tree in Major Grove, Henderson Co., Kentucky. Nut small but tree said to be regular and heavy bearer.

Marquardt—Parent tree dead. Formerly growing near Burlington, Ia.

McCallister—Parent tree near Mount Vernon, Ind. A pecan x shellbark hybrid. The largest pecan nut known. The parent tree some years ago was badly injured by fire but has now to quite an extent recovered and apparently will bear well again. The tree has been planted to quite an extent in the South where it bears scarcely at all but it is not believed that the behavior in the South is to be expected in the North for it is known that some hickories require the cold of a northern winter to grow well and the McCallister may require this to bear well.

Niblack—Parent tree near Vincennes, Ind. Said to be annual bearer and heavy cropper.

Norton—Parent tree in Calhoun Co., Ill. Probably the largest pecan of northern origin where the nut does not show evidence of hybrid parentage.

Kentucky—Parent tree in Gibson Co., Ind., near Grayville, Ill.

Rockville—Parent tree near Rockville, Mo. Pecan x shellbark hybrid.

Warrick—Parent tree in Warrick Co., Ind. Said to be very regular bearer.

Witte—Parent tree in Des Moines Co., Ia.

Upton—Parent tree in Des Moines Co., Ia.

Persian Walnuts

While these have been growing for a long time in certain sections of the northeastern United States they are seemingly more exacting in soil and climatic conditions than any other nuts noted in this list other than almonds. Winters must not be too cold or summers too hot and apparently a limestone soil is one of the best for them.

Varieties:—

Anderson—Parent tree in Greenwich, Conn. Same as Millbank.

Alpine—A large fine variety.

Boston—Parent tree in Roslindale, Mass. A fine variety.

Eureka—A fine variety.

Franquette—A standard French variety.

Hall—One of the best bearing varieties in many places. Nuts large but frequently not well filled.

Holden—Parent tree in Hilton, N. Y.

Lancaster—Parent tree in Lancaster, Pa.

Mayette—A standard French variety.

Meylan—A fine French variety.

Millbank—Parent tree in Greenwich, Conn. Same as Anderson.

Rush—Parent tree near Lancaster, Pa. A valuable variety for pollenizing other varieties.

On this list that has been passed around there is given such detailed information as we have about the different varieties. I will not take the time to read it but will be glad to answer any questions that may be asked.

Mr. Spencer: I would like to ask you to what extent you would put lime in the soil for nut trees?

Mr. Bixby: Black walnuts would seem not to require it. I would not say butternuts require much but English walnuts do. Perhaps the hazel nut would require some. At my place the English walnut trees near ash piles have thrived and the others have not, so I would say English walnuts need lime and the others perhaps do not.

Mr. Spencer: One reason I asked that question is that I received a letter from Miss Riehl and she said she was making a study of what to do with the ground under the chestnut trees. Where it is cultivated you know it washes terribly and she said she wanted to

plant it with alfalfa, but that alfalfa required the soil to be sweetened with lime to get a good stand and she understood that lime was injurious to chestnut trees. I wrote and told her I had a good many chestnut trees and had put lime around them and they were growing vigorously. I told her the land needed a little lime to get the roots started and that I did not personally believe that lime sufficient to make a stand of alfalfa would harm the chestnut, but I told her I would put the question up to the convention and try to get it answered and send her the information.

Dr. Morris: That would be a pretty hard question to answer, because I looked about the place and found limestone and saw that the chestnut trees were growing very successfully on it. Magnesium limestone that you find here in the East does not seem to harm the chestnut.

Mr. Rick: These counties around Lancaster have a great deal of limestone.

The President: It is evident that it is not only secretaries of the association that are industrious but also ex-secretaries. I think we can appreciate the work it took to get up a list like this and the value it is going to be to us for a long time.

Mr. Green: I appreciate the value of this paper. I would like to ask if Mr. Bixby intends to compile the various suggestions that will be forwarded to him, and if so I think it is about the greatest work that has been undertaken by the association.

Mr. Neilson: What has been your observation of the behavior of the McCoy black walnut?

Mr. Bixby: It is bearing this year when other varieties, except the Royal, are not bearing. It bears prolifically. I do not consider the nut as good as some others.

Mr. Spencer: I have considered it as good in quality as other nuts. If the black walnut is not filling I think that might be due to not sufficient summer heat.

Mr. Garber: I would like to ask you what is known about the behavior of the hickory varieties as to time of bearing, etc., particularly when top worked?

Mr. Bixby: Top worked hickories are very rapidly coming into bearing. I have heard of them coming into bearing one year after top worked, and often in the third year. The best record of a transplanted hickory, I think, is the hickory of Mr. Rush's, which you will probably see at Mr. Jones' tomorrow. That Weiker bore 13 years after transplanting.

Mr. Jones: I think it bore 10 years after transplanting.

Mr. Bixby: Top worked hickories bear much earlier. I have in my yard a tree that bore a few nuts last year which was set out in 1917, so you see that was eight years. It depends a good deal upon the variety. Black walnuts bear very early.

The Secretary: I believe that we can promise the membership that we will publish the latest list that Mr. Bixby can get ready for us.

Mr. Jones: What have you to say about the Ten Eyck?

Mr. Neilson: We planted one at Vineland and it took four years to bear.

Mr. Bixby: It has the thinnest shell of any black walnut we have tested, and I regard it as of great promise.

The President: Dr. Galloway is unable to be present and his paper will be read by the Secretary.

PLANT INTRODUCTION AS APPLIED TO BLIGHT-RESISTANT CHESTNUTS AND RELATED CROPS

By B. T. Galloway

Office of Foreign Plant Introduction, U. S. Department of Agriculture

At the suggestion of Secretary Colby, I desire to present at this time a brief progress report on the work conducted by the United States Department of Agriculture in its search throughout the world for blight-resistant chestnuts and related crops.

Explorations in foreign countries, for chestnuts and other tree crops, have been under way for many years but the work has been intensified during the past fifteen years, since it became evident that our native chestnut was likely to be eventually wiped out by the blight fungus. One of the first important results of this work was the discovery of the original home of chestnut blight by an agricultural explorer of the Bureau of Plant Industry, who was engaged in work in China. This discovery was made in 1913. At the same time, and in the same general region where blight was discovered, large areas of chestnuts were located, which proved to be a resistant species known botanically as *Castanea mollissima,* and now commonly referred to as the Chinese hairy chestnut. A large number of introductions of the nuts of this species have been made from China. The species has a wide range in China and varies as to size of tree, quality and size of nuts and possibly also ability to resist blight. Evidence has repeatedly come to light in China that blight has existed there for a long time and that numbers of ways have been devised for combating it. Undoubtedly, through long natural selection, the resistant strains we are now testing have been developed. In our exploration work we have covered practically the whole of China. In 1921-1922 a special expedition was sent into extreme western China. The result of this work was the discovery of some new types of Castaneas and a large number of Castanopsis, a related genus which we shall speak of later.

In the earlier introduction work seeds were brought in and seedlings grown at one or more of our Plant Introduction Gardens. The first seedlings were distributed somewhat promiscuously and in small lots. The losses were necessarily heavy, but enough trees were es-

tablished to indicate a decided blight resistance and other desirable qualities. The largest group of the Chinese hairy chestnut of the early plantings is at Bell Station, Maryland, where is also located one of our plant introduction gardens. The plantings at Bell were put out by the late Dr. Walter Van Fleet. Originally about 900 trees were planted. The trees were set out in 1912 and most of them are still living.

During the past three or four years a special effort has been made to grow seedlings in quantity from introduced nuts and to place these seedlings in the hands of co-operators willing to put out and care for half-an-acre to as many as three acres of the trees. We have encouraged the planting of the trees in orchard form for the reason that it is our desire to make sure of home-grown sources of seed. The seed supply in China has become quite precarious and it is highly important that we endeavor to produce our own seed as early as practicable. All the trees distributed during the past three or four years have been grown at our Plant Introduction Garden, Bell, Maryland. The distribution of seedlings has been confined to the eastern United States as it was deemed inadvisable to send the trees outside of the range where blight is known to occur. A somewhat extensive distribution was made in the spring of 1926, when something over 8,000 three-year-old seedling trees were distributed in the region indicated above. These trees have all been planted in orchard form and are being cared for in a careful way by our co-operators. In order to assure the production of trees outside of the blight territory, a large introduction of nuts was made last year from China and after very careful treatments at San Francisco, where the seed landed, it was sent to our Chico Garden for growing. This shipment was not very successful but we expect in another year or two to have trees from it for distribution on the Pacific Coast and points in the Mississippi Valley, where the blight does not occur. Other shipments of seed from various sources are arriving from time to time and we now have growing at our Bell Plant Introduction Garden collections of seedlings which we plan to distribute in the spring of 1927. We hope to have larger shipments of seed this year so that by 1928 or 1929 we can make additional distributions of this interesting introduction.

We had planned for an intensive study of the chestnut in China and especially in the northern provinces of China, this year, in the

hope that selected strains could be secured and grafting wood sent in from which to carry on our propagating work. Owing to conditions in China it was found necessary to temporarily suspend this work.

We have already referred to the exploration work in western China in 1921 and 1922. This work resulted in the securing of the largest collection of Castaneas and related tree crops heretofore recorded. The Province of Yunnan is a remote and inaccessible one and our explorer had great difficulty in getting seed out. The region and climate are peculiar, the lowlands being subtropical and the mountainous sections wet and cold enough in winter for heavy snows. It has turned out that most of the material secured consists of trees belonging to the genus Castanopsis. We have only one representative of this genus in the United States—viz: the Golden Chinquapin grown on the Pacific Coast. The trees are, for the most part, evergreens and will likely prove an interesting and valuable addition to our southern flora. Collections of these introductions have been established at twelve or fourteen places in the south and on the Pacific Coast. The Castanopsis are all trees, some of them growing to large size.

Owing to the fact that the Chinese hairy chestnut does not grow to very large size and cannot, therefore, be strictly regarded as a forest tree, we have been anxious to secure a chestnut or chestnuts that might in a measure equal in size and vigor of growth our native species. There is such a tree in China and to this we have given the name Chinese timber chinquapin. Botanically it is known as *Castanea henryi*. There is a tree of this species growing in the Arnold Arboretum and another small one in our collection at Bell, Maryland. Last year we were successful in grafting about 300 of these trees at our Bell, Maryland, Plant Introduction Garden. We used the Chinese hairy chestnut for stocks. We have also been fortunate in locating supplies of the seed of this chestnut in China and hope to have a large shipment this year. A shipment came in last spring, along with our Chinese hairy chestnut, which went to Chico, California, but unfortunately the seed was all dead. The Chinese timber chinquapin grows to a larger size than any other Chinese species, it being not uncommon to find trees 60 to 75, or as much as 100 feet high. The nut of this species is small—very much like our native chinquapin. Recently we have had information from one of our correspondents in China, who has been supplying us with seed, that the Chinese are using a dwarfing

stock for the hairy chestnut they are growing. This forces early production and enables the trees to be kept well in orchard form. We are endeavoring to secure nuts of this species. We believe it to be the so-called Chinese dwarf chinquapin, *Castanea seguinii,* which we have endeavored several times to introduce, but have not been successful.

We cannot close this brief report without referring to the remarkable work in the breeding of chestnuts conducted by the late Dr. Walter Van Fleet. Dr. Van Fleet began his breeding investigations long before blight was known. He produced many hybrids. All of the hybrids in which our native chestnut and the Spanish or European species were used succumbed to blight. Numbers of his hybrids are still growing in the orchard planted by him at Bell, Maryland, in 1911 and 1912. There is one outstanding form now growing at Bell which should be mentioned. It is a cross made by Dr. Van Fleet between *Castanea mollissima,* the Chinese hairy chestnut and our native chinquapin, *Castanea pumila.* This fine hybrid has borne heavily each year for the last five or six years. The nuts are about double the size of our native chestnuts and are sweet and palatable. The tree has shown no signs of blight. We are endeavoring to get up a stock of this hybrid by grafting on mollissima roots. Three or four hundred grafts were made last year and more will be made this season. This hybrid appears to be about the best thing in sight for orchard culture in the blight affected regions of the east.

The primary objects of all this work may be briefly set forth as follows:

1. To explore foreign countries for new and promising chestnuts and related tree crops and to introduce, grow and test such crops in the United States.

2. To place the new crops in the hands of orchardists, plant breeders and others with a view to aiding in the rehabilitation of our chestnut orchards and possibly our destroyed forest areas. The production of nuts as a food crop and trees for timber, lumber and tanning are all involved. The utilization work is in the hands of other branches of the Bureau of Plant Industry.

The President: I will ask Dr. Smith to open the discussion on chestnuts, basing it on his experience in Japan recently.

Dr. Smith: I think I can say all I know about the chestnut in a very few minutes. Mr. Chairman, I feel very greatly flattered by the statement that I know something about the chestnut. I have seen in Japan a few chestnut orchards in which they are propagating just as we did here 20 years ago. It is an industry of comparatively small extent, but growing in Japan. The most interesting thing I found out about the chestnut was the taste of nuts from the European trees, where they had been doing a good deal of selection with a strain of the European chestnut. I tasted them in Peking and they are almost identical with our variety of Paragon, which was propagated in this section before the blight came.

Apparently we are on the eve of being able to import grafted trees. I would like to call attention to the fact that thus far the government has been importing seedlings almost exclusively, but in Dr. Galloway's paper he mentions importing grafted trees and scions. There is no reason why this cannot be done. I imported from Japan some scions of persimmons and they are growing. We ought to be able within a short time to import scions into this country. The report about the hybrid tree bearing nuts is important. There is really great progress implied in that paper.

Dr. Morris: The mollissima chestnut will blight. It is comparatively resistant but not wholly. Hybrids we get from the chinquapin are likely to be more resistant. I have a cross between the mollissima and our native chinquapin not yet bearing which is extremely thrifty. It is 12 years old. It promises to be a timber tree and also a tree that will bear nuts. I have a number of others of that same breed and this one has outdistanced all the others in which I made the same cross. I think the henryi is likely to be best for wood. Our common chinquapin west of the Mississippi River grows to a height of 50 feet.

THE CHESTNUT BLIGHT

Preliminary Report on Induced Immunity

By Dr. G. A. Zimmerman, Pennsylvania

Some thirty-five years ago, when blight killed some of my favorite pears on my father's farm, and spared a Kieffer, I first realized that there was some difference in the reaction of living things to disease, which is now known as immunity. My first actual experience began as a kid when I took some of my father's tobacco, stole away, and tried to play the part of a man. After that I was more or less alert, and, as a student of medicine, the subjects of immunity and internal secretions absorbed much of my spare time and appealed to me so strongly that, even before my graduation, I had begun to make vaccines and used them in the dispensary of the Maryland General Hospital in Baltimore. Later I used them in my private practice. During this time the chestnut blight raided the country and it was my firm conviction that artificial immunity, or rather induced immunity, might offer a solution for that calamity. I even drew the attention of one of our governors to the subject, who was considerably interested and turned the letter over to some prominent authorities who tabooed the idea and allowed it to die a natural death. In the meantime the chestnut blight rages.

Three years ago, when casting an experimental eye around, I made an emulsion of the black aphis, then disturbing the cherry trees. This emulsion I injected into a small tree which I thought was affected with more aphis than any of the others. Forty-eight hours later the new growth on the top of this tree was dead. This convinced me that the material was quickly absorbed, was highly toxic and that the plant reacted to this antigen in a similar way to that of an animal.

I was now prepared to tackle the chestnut blight. Unfortunately I burned out, and my laboratory with it, about the time I landed in the hospital five years ago, and I had to prevail on some one else to make the serum. I don't know whether my persuasion succeeded or whether Mr. Gravatt felt disposed to help me go ahead and make a fool of myself, but anyway he kindly prepared the basic material

from which I completed a serum and began my first injections last year.

Before proceeding further it is well to understand that any substance, known as an antigen, thrown into the system of any living body, will either kill the cells or they will manufacture a ferment which will digest and destroy it. This *excess ferment is the immunizing principle* in all cases and does not exist until the attack against the cells makes the manufacture of it compulsory. In this they are like the human being. They won't do anything until they are compelled to. Strictly speaking, this means that there is no such thing as "natural immunity." It is all acquired, and every chinquapin or chestnut which has any degree of immunity to the chestnut blight furnishes evidence that some time back through the ages these plants have been attacked. If the active disease gradually stimulated the manufacture of this ferment, it is evident that the products of this disease, which cannot produce the active destruction, will also stimulate the production of this ferment, and it is upon this idea that I am acting. To be more specific, what I am after is to get enough of this defensive ferment in the body of the chestnut tree to either kill the blight germ or hinder its development. Some plants already retard the development, such as the chinquapin, Chinese chestnut and some of the Japanese chestnuts, but none will hinder its development entirely. In fact, after thirty years I have found that the American chestnut has scarcely enough of this defensive ferment developed to be worth talking about. This power of the defensive ferments of the chestnut to hinder the development of the blight organism is termed "resistance."

I have found that old people, or old animals, develop this defensive ferment to a very moderate degree, if at all. Young animals or people usually develop it to a high degree, but once in a while one will be found that cannot be made to develop it by any known means. Presuming this would be the same with the chestnut, I confined myself to young plants. I have observed, however, that the sprouts surrounding the very large chestnut trees are usually dead. Apparently the power of endurance is not so great as that of the younger trees, many of which still continue to throw out sprouts from the roots. This, I presume, is due, like the old animal, to the inability of their cells to manufacture the protective ferments in sufficient quantity.

Another thing I have learned in animals is that after every in-

jection there is a period of low resistance, coming on a few days after injection and lasting anywhere from a few days to several months. In fact no animal seems to get along well during the time the serums are administered. The idea is to give a number that is known to protect, usually from six to ten, and then stop. In a few months the results are apparent. This *ferment when once formed is inheritable.* Now let us examine some of the reports of injections and note what is found when applied to the plant.

I am simply mentioning a few, the reactions of which were rather noticeable, in an effort to show:

1st—That a chestnut tree will develop protection against blight.

2nd—That some, like the chinquapin x chestnut hybrid, will develop a sufficient amount to cure the infection with a remarkably small amount of serum.

3rd—That the infection will heal over.

4th—That in certain cases the American chestnut will develop enough defense after three doses to at least offer a hopeful prospect providing the top of the tree is protected.

5th—That the three injections in small American chestnut will not protect against direct innoculation.

No. 100

June 26, 1925. Height 10 ft. Blighted badly at the root. Almost circled. Also two limbs badly blighted. First week no general effect was noted. Locally for a few days the old infection seemed more virulent. July 12 cut out part of the old blighted area at the crown. Only about three-fourths of an inch of the cambium remains and it is affected. It looks, however, as though the disease process has stopped and formed a line of demarcation. July 15th definitely visible amount of callus being thrown out at the old injection site. Progress of the disease seems to have been retarded at all infective points.

July 15th second injection. Progress of disease does not seem to have advanced but the tree is so nearly surrounded at the base that it may not survive.

July 27th third injection. If this tree is saved it will be a miracle on account of its far advanced stage at the time of vaccination.

August 4th. Tree still alive with no evidence of further invasion. Tree is getting much thicker both above and below the crown in-

fection and the little area of green wood connecting the two points is thickening. The tree looks healthy otherwise, with no signs of sprouts coming from the root which is one of the early evidences of infection sufficient to close off the circulation.

October 26th. No evidence of further invasion and tree looks fine, although the injury of course is not fully healed over. There is no extension of blight into the callus. The tree is dormant. These three injections apparently protected this native American chestnut pretty well.

June, 1926. Tree looks thrifty and apparently recovered. Sawed off top and grafted.

July 3. Grafts died off and examination showed blight had reinvaded the callus and killed the tree.

September 8, 1926. Old stock dead. Four healthy new sprouts on its roots.

No. 103

June 26, 1925. Height four and one-half feet, 5-8 inch in diameter. Tree a sprout from a blighted stump but apparently healthy. Given three injections and on Aug. 10th innoculated with a piece of blighted bark injected under the bark and waxed. Area became infected and went almost around the tree, although the infection did not seem very virulent, for there are areas of live cambium in the infection, which has now become apparently inactive. This tree, like 102, is apparently not sufficiently protected by three injections, or sufficient time had not been allowed before the innoculation was made.

May 25, 1926. Top blighted and died at area of innoculation. Grafted with Fuller and stump cut off four inches above ground.

September 8th. Graft doing nicely and no further evidence of blight.

No. 106

July 15, 1925. Japanese chestnut 45332 from U. S. Dept. Agr. Tree six feet high. Tree showed large area of blight at first crotch and on a couple of small limbs above site of first injection. This is the last of several Japanese trees to blight and each time killing the tree to the ground in its turn, the roots sprouting again the following year.

July 24. Large area seems to be walling off and bark separating. A

lot of callus is being thrown out but the healing process is not conclusively in evidence yet.

July 27. Blight area ceased invasion entirely on limbs. Bark has separated and fallen off and infections are almost healed over. These are the limb infections above referred to. Received second injection on this date.

September 10th. Small blighted areas on limbs healed entirely and the larger area in the crotch has come together considerably although not so noticeable on account of its size.

October 26th. All small areas are fully healed and look healthy. The large area is about half covered with healthy looking callus and from all appearance blight is fully under control. This is the only Japanese chestnut that has even recovered for me although I made special effort to save them, cutting out the blighted areas and covering with antiseptic and paint or wax.

July 18, 1926. Tree looks fine and covered with burs. Blighted area in crotch about an inch wide yet and healing nicely. Another injection given on this date.

August 19th, 1926. Injected north limb.

September 8, 1926. Tree looks splendid.
One more. Very interesting. Quoted fully.
No. 112

August 4, 1925. Tree 30 inches high and 1-2 inch in diameter. Morris No. 1 grafted in 1924 on a native American stock. Morris No. 2 is a native American x chinquapin hybrid, I believe. Tree is badly blighted at crown. Perhaps too badly to do anything with. Large injection of serum given on this date.

August 10th. Noticed that the bark is dead all the way around the plant and the bark separating exposes the wood under the cambium. A circle three eights of an inch wide all around with much greater width on one side, about 1-2 inch. Had I known this on August 4th, I should have saved my serum.

August 15th. Blight seemed checked and callus is being thrown out from above in large amounts. Covered the denuded ring with paraffin. It is now dawning on me that perhaps the callus might jump the gap and take up the circulation again. Tree is sending up shoots from the roots, which is one of the best evidences that the

circulation is shut off. The leaves are quite yellow and the tree looks bad.

August 30th. Callus nearly if not quite together. I took my knife and cut the edges of the callus just a little thinking it might heal together easier.

September 30th. Callus has united, having jumped the gap and taken up the circulation nearly half way around the tree. The leaves are again green and the tree has a good appearance, which shows that it has again taken up the normal function.

October 26th. The tree seems apparently entirely recovered and healthy, although the denuded area has not entirely healed over. There is no evidence of further blight, and no more callus being thrown out. It has evidently become dormant for the winter. Evidently Morris No. 1 has a good deal of immunity, for this one dose has apparently not only cured it but protected it from further invasion up to this time. I have not seen any native American chestnut show anything like this amount of resistance following the injection of one dose, up to this time.

September 8, 1926. Tree apparently healthy, leaves of good color, made a nice growth this summer, and the old scar is almost healed over.

Apparently, from the above, it is possible to inject blighted trees of the chinquapin, chinquapin x chestnut hybrids, Japanese, and Chinese chestnuts and have them recover, but with the exception of a few cases, the American chestnut that is blighted at the crown will die off before enough ferment can be stimulated to protect it. However, in a few cases, especially if injected early in the spring, they may survive. I had some that had every appearance of recovering until I sawed the top off and grafted them. Then they were attacked with renewed vigor and died promptly. After a few injections it is altogether probable that the American chestnut will perform similar to other chestnuts that have a certain amount of resistance, like the Japanese or chinquapin.

Amount Necessary to Protect

One dose has apparently protected the Morris No. 1 hybrid.

Two have protected a Japanese.

One, two and three have not protected an American, although No.

100 had offered great hope until I ignorantly cut the top off and grafted it. It looked so good that I thought it was safe. I now know that that thing can't be done.

Some sprouts seem to have root systems that are of such low vitality as to die off under the shock and toxic products of the serum, as in No. 110 whose roots died without any evidence of blight perceptible.

Automatic Serum

As a source of immunity this must not be overlooked. When an area becomes blighted nature makes an attempt to check the invasion by building a wall of cells around it. This wall will be digested as the defensive ferment is formed and serves as a source of automatic serum. This, while detrimental when only a little immunity is present, becomes quite valuable as immunity develops, as frequently all that will be necessary is to start this activity. With this in mind I have made no attempt to cut away any blighted area unless there was danger of its encircling the tree before it had a chance to recover.

My Future Plans

Four years ago I grafted a chestnut on a chestnut oak. My idea then was to keep it growing on the oak for many years in an attempt to have scion and stock become congenial and form perfect union. I then made a blunder, for now after four years and the tree containing six burs, I have nothing, for the variety is known to be practically worthless. It might be used as an intermediary to regraft other better varieties of chestnuts. I therefore determined, when I saw the encouraging results from my antigen, that I would not make the same mistake again, and accordingly wrote to a large number of men asking their first and second choice chestnut, regardless of its blight resistance. From these replies I selected the following varieties and procured scions and grafted them here at Piketown:

Fuller for its good quality.

Boone for its early ripening and regular bearing.

McFarland for its hereditary qualities.

Rochester for its thrifty growth as a stock.

Dan Patch, Riehl No. 62 and 68, Champion, Paragon, Drescher Merribrook, Parry, Old Barndoors, and others for various reasons.

Most of the grafts are growing nicely and many of them have

had from one to two doses of serum. I want to give each of them at least ten doses, but it is obvious that I could not go far this year, having arrived on May 12th and then having to graft the chestnuts and have them develop sufficiently before any immunization work could be started. This work was begun on July 18th and thus far this year few others than the grafts were injected. Many of these grafts were made on plants that were injected also last summer, or the sprouts therefrom in case the original plant died. My idea is to immunize these few to a high degree and use them for propagating purposes. It is readily seen that a chestnut that bears quite young is of decided advantage in this work. I might mention also that I have one native American chestnut tree badly blighted but that bears regularly a pint or so of nuts. I have some two year old seedlings of these nuts and shall immunize some of them for timber purposes, until I can locate an American chestnut noted for its early bearing.

In conclusion let me state that I suppose that I am subject to criticism for not being scientific, but it must be remembered that I do not have the physical strength nor the finances to carry on this work as it should be done to be thoroughly convincing. Incidentally if anyone was willing to furnish a little cash for the running of a laboratory and employment of a couple of persons to help me, I should be glad to be scientific enough in this matter to satisfy the most critical. However, as it is I must content myself with my main job of trying to recover my health and growing some chestnuts in the blight pested mountains at Piketown. I might furthermore add that I am wholehearted in this subject. I realize of course the gigantic magnitude of the work, and while I may make blunders innumerable, I am just as confident that I am on the right track and that success will crown my efforts.

Dr. Morris: I am very glad to open the discussion for this audience will need a brief definition in order to comprehend this extremely important work. We must distinguish between a vaccine and a serum. What is the difference? There is a weak form of disease which puts out a weak form of poison in the blood. When this poison is introduced into the blood of another individual it causes the development of elements of protection or defense that are needed for natural control of a more serious disease. Vaccination with cowpox, for example, forces the body of mankind to manufacture defense ma-

terial which prevents the development of smallpox. Now what is a serum? A serum is a sap or fluid of an organism containing defense material which has been brought out by a vaccine which was introduced for that purpose. In botany a serum would have to be a sap from a plant that contained defense material. There is great significance in the fact that when the top of Dr. Zimmerman's tree was sawed off the tree died. Why? It is the top of the tree that manufactures defense material, as well as food for the plant. The top was busily engaged in making material for defense.

Dr. Zimmerman says no tree has natural immunity. I would dispute that point because relative immunity, at least, must exist in order to protect a tree against bacteria and fungi which attack it whenever it is wounded in any way. Some of the chestnut trees have a relative degree of immunity to blight while others are highly vulnerable.

Dr. Zimmerman: I still believe that a tree does not have natural immunity.

Mr. Spencer: As far as I know there is no blight in Illinois.

The Secretary: There may have been some blight in the Riehl orchard but there is none there now. It has been burned up. I do not think we need to worry about the blight in Illinois. We do not have the same situation as in the East where there are immense forests. Pathologists are working on the condition all the time.

Dr. Thiess: Years ago I bought from Mr. Riehl a chestnut which he called the Paragon, which he said was highly resistant to blight. It has been growing in my orchard two years and there is not the slightest blight on it though we have blight all around it.

Mr. Ellis: I find of the varieties sent out the one I got from Illinois the most blight resistant of any I have seen.

Mr. Bixby: That is the variety that has done the best for me.

Mr. Ellis: I would like to ask Mr. Bixby if he knows whether Mr. Endicott is in the business of selling chestnuts.

The Secretary: Mr. Endicott does not sell chestnuts.

Mr. Ellis: There are some nurserymen there that had chestnuts for sale and also some other nursery stock.

SOME OBSERVATIONS WITH REFERENCE TO NUT BEARING TREES IN DISTANT LANDS

By Dr. J. Russell Smith, Professor of Economic Geography,

Columbia University, New York

I want to talk about the Persian walnut which seems to me to be exceedingly suggestive in many commercial and scientific aspects. One of the most suggestive things in the whole matter of tree crops is the statement in Sargent's great book that "In its wild form the Persian walnut is a worthless nut." Now think what the worthless nut has become in the present Persian walnut of the markets.

This tree is a native of Persia. It has spread both east and west until it has spread around the world. I have myself seen it in Japan, Korea, near Peking and Shanghai and also in Shansi in China, in Kashmir, Persia, Palestine, Asia Minor, right straight across Europe from Constantinople through Switzerland to the English Channel. A tree that has adjusted itself to such varied climates has possibilities that we have hardly realized, and certainly not utilized.

While we have thousands of them here in the United States no one has got to the point of having any important commercial Persian walnut orchards east of the Rocky Mountains. It has done its best on the Pacific Coast for two reasons. In some places the summer is not so hot there. The summer is much drier where it is hot. The winters are not so cold and the spring is more even in its advance. The summer of England is cold, the summer of Italy is hot but dry. Fungi thrive in the heat and humidity. That combination, heat and humidity, makes our eastern summer bad for plants imported into this country from Europe. An example of what this does to European plants was the failure of the wine grape upon which the Virginia colony expected to base its whole business. The colony went broke until shipments of tobacco made good. Those wine grapes were the first of a very long series of failures, more or less complete, including the importation of the Persian walnut to the eastern states.

One thing that has prevented any commercially successful growth

of the Persian walnut among us is our changeable winter and spring. Therefore trees like the peach and the Persian walnut, both natives of Persia, do not do so well. You bring them here and they come into growth with the first days of spring. Then along comes a frost and of course there is great loss. But the Persian walnut has managed to live through this changeable climate here in the East and in time we can get varieties adapted to an industry if we keep working at it. It is really at home on the Pacific Coast. As it has worked its way into China, Korea and Japan, nature has doubtless done much there to get varieties ready for us, for there the tree has had to survive heat and humidity.

Mr. Reed has come back from China with a large number of seed nuts which have been widely distributed for experimental purposes. I have great hopes from those nuts. I expect that they are going to have a high degree of relationship to the parents.

How did those wild Persian walnuts, worthless according to Sargent, get to be so good?

I observed that throughout the old world the country is essentially devoid of trees. For example I have ridden several hundred miles through Persia and never saw a forest or anything that looked like a forest. While there I saw a few walnut trees and they were in carefully kept gardens. There was no chance for stray pollination from poor trees. Naturally if they grew seedlings they grew them from *good* Persian walnuts. The pressure of water scarcity in a land of meager irrigation urged their cutting out all the bad trees and keeping the best ones. Thus the available seed was hybridized from generation to generation from two good parents. Here a fairly constant tree breeding process has been going on perhaps from the time of King Darius, several hundred years before Christ. The same thing has probably happened in many of the Chinese and Japanese fruit gardens.

We have in America a problem of introduction and of breeding from the introductions. We want to find the best trees throughout the world for our particular use. In the case of the Persian walnut here in this part of the world we need to get two immunities, immunity from early growth and therefore frost and winter kill and, secondly, immunity from fungus attack. In getting fungus immunity we have a

very fine opportunity in the trees that are growing in Japan. It is very well known that most of the Japanese flora thrives when it comes here. The Kiefer pear is one in point. Look at the way it resists the blight. It has a tough leaf. The reason Japanese trees are so vigorous here is because they have been exposed to a climate very much like our own. In Japan there are a great many Persian walnut trees. Certainly the mountains of Japan are very promising places to search for Persian walnut trees that will withstand our fungus in the summer and also freezing weather.

The next thing we want to get resistance from is the frost. The great weakness of the Persian walnut is early spring growth. There are freaks among the Persian walnuts that stay dormant very late in the spring. In the Grenoble district of France I once saw a tree which, at a short distance, looked as though it were dead on the 19th day of June. At that very time people were out estimating the crops on neighboring orchards. This dead looking tree was a perfectly healthy, live tree, just beginning to show the first sign of spring growth. There was a tree that had slept a month and a half after the other trees had started. Such trees are fairly common in some of the walnut districts of Europe. I saw in Switzerland this year, while riding through, Persian walnut trees just showing buds and others almost in full leaf. I point these things out in order to show the possibilities of introducing breeding stocks, if any one should be seriously considering the question of improving the Persian walnuts to meet our needs here in the eastern United States.

Another point is the location I found for the culture of Persian walnuts. The most conspicuous plantings I have seen outside of France have been in upland valleys. I am not familiar with the commercial locations in China and Japan, therefore I will not discuss those countries.

In going across Asia Minor it was most striking that near the top of the Taurus Mountains were hundreds of the most gorgeous Persian walnut trees, standing along the roads and in the wheat fields for a distance of perhaps 20 or 30 miles. Below in the Sicilian plain near Tarsus they were scarce. Out on the plain of Asia Minor more were to be seen. Then as the train drops into another valley en route to the lower levels near the Sea of Marmora, there was a place where for

many miles one need not go more than 100 feet to reach a Persian walnut tree. They seemed to be scattered about in every way except in rows. Similarly I found in the Balkans another valley where they were in sight for miles, and then I dropped down into a plain of one of the larger branches of the Danube and they were scarce.

I have never seen outside of the Grenoble district walnut trees so common as they are in the territory near Geneva. The gentleman who says you cannot grow walnuts along the roadside should see this section. He ought to go to Switzerland. In this territory there were hundreds and thousands of trees, but never an orchard. They were along roads, between fields and around houses. In fact most of the European Persian walnuts, so far as I can gather the facts, are grown not in set orchards but in scattered trees. I have been in both of the chief districts of France and only in the Grenoble district were there any orchards. Most of the trees are planted along roads or out in the fields, often 100 feet apart.

Persian walnuts seem to have a great love for ruins and thrive among them. I suspect it is the lime in the soil. The famous ruined city of Baalbek in Syria, undoubtedly one of the most famous pieces of masonry in the world, is bowered in Persian walnuts. Of course that place has lime and mortar for many feet under the trees. Palestine is full of them. They cluster around the old walls of Constantinople.

The idea I wish especially to leave with you is the great importance of importing better stock from foreign countries, better varieties than we yet have, for themselves and for breeding still better trees. The time for importing seedlings is past. Scions are hard to import. But living trees, propagated in foreign nurseries, are not hard to get or import. The Orient will furnish the fungus proof trees. Perhaps the American consul at Grenoble, France could help us get some late blooming strains.

The President: Baalbek and Palestine are full of walnut trees, and so is Lancaster. The paper is open for discussion.

Mr. Littlepage: If Dr. Smith will go down to see my walnut trees he will find that I have torn my fence down, plowed up the ground, planted soy beans along beside them, and the trees have made

more growth in two years than they ever did before. I still believe if you want to cultivate nut trees you must plant them on rich ground, just as you would do anything else. I have not changed my mind. I have just moved my fence.

Mr. Neilson: Did you have an opportunity to see or learn anything about the heartnuts?

Dr. Smith: The Yokohama, Japan, Nursery Company is one of the widest known of its kind, and it is quite possible you can get in touch with them and get information about the heart nuts.

Mr. Bixby: I asked E. H. Wilson about the heart nut in Japan upon his last return from there. E. H. Wilson, perhaps as many of you know, is assistant curator of the arboretum, and he has spent many of his years gathering specimens for the arboretum. He says the heart nut in Japan is nothing to rave about. While he brought a number of specimen back with him they are not any better than, if as good as, some of the heart nuts we have here. Of course he did not pay particular attention to the heart nut but he said, so far as he knew, the heart nut was not grafted there at all.

Mr. Jones: I have imported the heart nut several times, 50 pounds of them. They run about the same as in this country. Of course it might be that in those orchards over there we could select something better than what we have. I also wrote Mr. Wilson and he promised to do something. It seems to me some of the other government men might help too.

NUTS AS A SUBSTITUTE FOR COW'S MILK

By Dr. J. H. Kellogg, Battle Creek, Michigan

For ages, cow's milk has been a staple food, especially in highly civilized communities. Recent researches and observations have clearly shown, however, that in spite of its great value as a human foodstuff, it is not perfectly adapted to human needs. Valuable as cow's milk is as a staple food for adults, it has a few serious drawbacks.

1. The casein of cow's milk forms in the stomach tough curds which sometimes cause indigestion and autointoxication. This is the reason that cows milk causes sour stomach in some persons and makes others "bilious," especially persons suffering from acidity.

2. Cow's milk is deficient in iron. It contains only one-third as much iron as does human milk. Infants and adults fed on cow's milk become anemic.

3. Some infants are "sensitized" to cow's milk so that its use even in small amounts may give rise to severe symptoms of poisoning. Many infants die annually from this cause.

4. Many adults are sensitized to cow's milk and suffer in consequence from headaches, asthma, urticaria, eczema and other skin eruptions, and are relieved of these disorders when milk is rigidly excluded from the diet.

5. Cow's milk, like other animal products, may carry the germs of tubercular disease and other infections to which cows are notably subject. Milk is never perfectly safe unless it is known that the cows which produce it are subject to frequent and competent inspection to insure their freedom from disease.

6. Cow's milk, from the conditions under which it is produced, is always more or less contaminated with filth of a most repulsive character. Every drop of ordinary commercial milk contains thousands of manure germs, derived from the intestine of the cow. Even certified milk is not wholly free from this undesirable element.

7. Many persons suffering from autointoxication find it necessary to exclude milk from the diet in order to change the intestinal flora

because of the retention and putrefaction of undigested curds in the colon. Professor Tissier, the eminent French physician and bacteriologist of the Pasteur Institute, of Paris, discards milk entirely and prohibits its use by his patients.

8. Infection from cow's milk is a known cause of acute colitis in infants and recovery is often prevented by its continued use. The disuse of milk is always necessary in cases of diarrhea in children, and in many cases of colitis in adults. The disuse of milk is necessary to insure recovery.

Many persons dislike cow's milk and can not use it.

In spite of these defects, most persons can use cow's milk without discomfort and even with benefit; but there are not a few who have discovered that milk "does not agree" with them and who avoid it. Others suffer almost constantly from headache because of the toxic effects of milk without being aware of the cause. Still others are constipated or suffer from colitis, not knowing that milk is the cause of their suffering.

My attention was first called to the fact that milk disagrees very seriously with certain persons more than 40 years ago. At that time milk, especially hot milk, was a very popular remedy and was recommended for almost every form of indigestion. Many physicians prescribed hot milk almost as a routine practice. In Europe so-called milk cures were found in every health resort and were very much patronized. Among the patients visiting the Battle Creek Sanitarium I found many who had tried the milk cure and with disastrous results and who on this account protested most vigorously when its use was suggested to them. In a few cases in which I insisted that the patient should make a trial of the use of milk, the unpleasant effects which the patient had previously experienced were repeated. I soon became convinced that the objection to the use of milk was not whimsical, as I had at first supposed, but was a real difficulty which must be dealt with.

In seeking for a solution of the problem it occurred to me to undertake the preparation of a substitute for milk from nuts. The study of organic chemistry had brought to my attention the fact that the protein of nuts so closely resembles that of milk that it was by some

authors described as plant casein. Oily nuts, as Sherman has pointed out, are the vegetable analogues of meat. They consist almost wholly of fat and protein.

Nuts contain very little cellulose, so that most nuts are by crushing easily convertible into a creamy emulsion which with the addition of water acquires the consistency and appearance of cream or milk.

To be readily digested, nuts must be brought into this emulsified state. When even small fragments are swallowed without being emulsified they pass directly through the alimentary canal with practically no change. When nuts constituted the staple food of our prehistoric ancestors chewing was not a lost art as it has almost come to be. Our relatives the primates, all of whom are extremely fond of nuts, know how to eat them properly. If you offer an almond or a walnut to a monkey or a chimpanzee he will seize it with avidity, tuck it away in his cheek pouch and beg for more. After storing all you can be persuaded to give he will proceed to chew them in a thorough-going manner. Not the smallest particle will be allowed to escape the action of his powerful jaw muscles, and the nut cream which will enter his stomach is one of the most easily digestible, readily assimilable and highly nourishing of all forms of nutriment.

We have forgotten how to chew; at least, we do not chew as we should. We have so long depended upon the cook to do our chewing for us with the vegetable grinder and other mechanical devices, we have acquired the habit of swallowing our food with only sufficient mastication to prevent choking. Many people swallow solids like pills, with gulps of water to wash them down. Eaten in true physiologic fashion, as the chimpanzee eats, chewing every morsel until thoroughly liquefied and emulsified with the saliva, the nut is not only incapable of producing indigestion but an excellent remedy for some forms of gastric disorders.

But in these hustling days when trains stop five minutes for dinner and business men habitually swallow a three minutes' lunch, it seemed hopeless to undertake to change the American hurry habit, so the only thing to be done is to supply the public with nuts which have been chewed in advance by machinery.

A notable fact which evidences the exact adaptation of nuts to

human nourishment is the possession of the particular kind of protein which the body requires for building its muscles, nerves, glands and other living structures.

The proteins of cereals and legumes are incomplete and not capable of supporting life indefinitely, but the protein of nuts contains all the "building stones" required for the construction of the "house we live in."

This fact, a recent discovery of the nutrition laboratory, is a scientific confirmation of the view long held by naturalists and paleontologists that nuts supplemented by fruits, tender leaves and shoots and succulent roots, constituted the food supply of the earth's primitive inhabitants.

The protein of nuts is of the same high quality as that of milk and is in no way inferior to the protein of meats. The delicious fats and oils of nuts are the most digestible of all substances of this class. Taken in combination with the other elements of the nut, they form a fine emulsion which is readily absorbed without producing the digestive disturbances which frequently arise from the presence of irritating fatty acids which are practically always present in ordinary butter and other animal fats in common use.

A remarkable property of nut milk in which it has shown itself to be superior to cow's milk is in promoting the secretion of milk in nursing mothers. This property of nut milk was noted fully 30 years ago, within two or three years after Malted Nuts was first made, and its value for this purpose has become known to the profession to such an extent that it is regularly prescribed by many physicians for nursing mothers who need assistance of this sort.

Dr. Hoobler, of Detroit, published some years ago the results of a careful study of the comparative value of different foods and different dietaries for promoting the secretion of milk and found nuts to be superior to all others, even not excepting cow's milk.

Nuts are a form of nutriment especially adapted by nature for human sustenance, whereas cow's milk is a product adapted to the nourishment of calves whose nutritive requirements differ from those of the human infant. Nut milk is thus capable of rendering a double

service, indirectly by increasing the maternal milk supply when this is deficient and directly by supplying the best substitute for mother's milk and cow's milk which has yet been discovered.

A fact of importance in relation to the protein of nuts and other plant proteins was pointed out first by Tissier of the Pasteur Institute, and later by Torrey of Cornell University. These eminent bacteriologists both noted that plant proteins have little tendency to take on the putrefactive changes which are always found present in animal proteins exposed to the influence of warmth and moisture.

My first experiments in an effort to make nuts more digestible led me to produce peanut butter. This was for several years produced in small quantities by consumers with the aid of small hand mills especially devised for the purpose. It has now come to be a food staple manufactured by numerous companies and may be found in every grocery in the land. The methods of production now in general use, however, are not altogether satisfactory. They involve roasting processes in which some of the nuts are burned and thus rendered very indigestible.

In my efforts to find a substitute for milk, peanut butter did not prove to be satisfactory. Although closely resembling nuts in its composition, the peanut is a legume rather than a nut and contains a considerable proportion of raw starch and so requires thorough cooking before it can be well utilized by the human digestive apparatus. By avoiding roasting and adopting special methods of cooking I succeeded in producing a product resembling malted milk, and for most people fully as palatable, which has been quite extensively used under the name of Malted Nuts. But true nuts are ready for immediate use as they come straight from the hand of Nature without any culinary preparation whatever and their digestibility is certainly not improved by cooking.

For complete nutrition, the protein and fats of which nuts consist almost exclusively, must be supplemented by carbohydrates. In the natural dietary these are supplied by fruits, green shoots and roots. In cow's milk this element is represented by lactose, a carbohydrate which is not only a food but a protective agent of the greatest value.

Meat, which consists of protein and fat, quickly undergoes putre-

faction at ordinary temperatures. Milk, which consists of protein and fats with the addition of lactose, does not putrefy but sours and after souring is no less wholesome than before; whereas meat in a state of putrefaction is highly poisonous. Meat placed in milk does not putrefy, the putrefaction being prevented by the lactose in the milk. In the intestine lactose exercises the same protective influence.

Continuing our experiments with other nuts, especially almonds, cashew nuts, pecans and pine nuts, we finally succeeded in producing a series of nut creams which we found highly satisfactory as substitutes for cow's milk and cream. The rich, nutty flavor of nut creams is as acceptable to most palates as that of milk and proves quite acceptable to those who do not like milk and with whom milk does not agree.

As a diet for adults nut creams are complete substitutes or alternates for the cream and milk of the dairy.

In a case in which a person is sensitized against eggs as well as milk and all other animal products, nut milk is a very precious resource indeed. Because of the great prevalence of colitis, cases requiring a substitute for cow's milk are becoming increasingly frequent. Thousands of persons are suffering great distress and inconvenience from frequently recurring sick headaches, attacks of asthma, eczema or other skin eruptions, so-called "bilious attacks," urticaria, and other nervous affections, who might be entirely relieved by the substitution of nut milk for ordinary milk and cream, and the exclusion of eggs, fish and meats from the dietary. Hundreds of infants' lives might be saved annually by the use of nut milk in the feeding of infants sensitized to cow's milk. The use of nuts in infant feeding has been practiced in China and Japan from the most ancient times. This practice is still current in these countries and also in some parts of the Philippines.

The use of nut milk is by no means confined to those who cannot use cow's milk. It is a delicacy which everybody appreciates. It may be used in practically all the ways in which milk is employed for desserts, ices and sundry delicacies.

Persons who find difficulty in changing their intestinal flora should substitute nut milk for cow's milk. The good result will in many cases be immediately apparent. This is especially important in cases of colitis, for it is known that all animal proteins aggravate this obstinate infection of the colon.

But perhaps the most valuable service to be rendered by nut milk is its use in the feeding of young infants with whom cow's milk does not agree even when skilfully modified, as is often the case. In such cases it is a veritable life-saver. When the child is older, it may be gradually trained, in many cases, to tolerate cow's milk in moderate quantities. Many infant lives have already been saved by the withdrawal of all animal proteins during the early months of suseeptible infant feebleness.

I might mention many cases of this sort have come under my personal observation within the last 25 years. I will refer briefly to a single recent case. A child of three years of age. Had suffered from colitis almost from birth. The parents, wealthy English people, had consulted many specialists in London, Paris and other European eenters but without finding relief. They were finally told that the only hope was that the child might ultimately outgrow the difficulty. The child was finally brought to Battle Creek. Every effort was made to eliminate the infection but without success until eow's milk was wholly excluded from the child's dietary and nut milk substituted. Improvement began at once and the child was soon well advanced toward recovery. I have seen equally striking results in numerous cases in which no substantial improvement could be secured until animal proteins of all sorts were eliminated.

I have no doubt that there will in time develop a large demand for nuts because of the precious quality of their proteins and their exaet adaptability to human needs. Dr. Sherman in his recent masterly work naively remarks that nuts should not be regarded as a substitute for meat since. as a matter of faet, they are the original staple of the human dietary for whieh meats have in more recent times been substituted and with results which are by no means altogether desirable.

Numerous seientific writers have in recent years made the suggestion that the necessity for economizing our food supply will in time require the elimination of meats. When this time arrives, nuts and nut products will come into their own and will again assume a prominent place in the human dietary and will no doubt aid in the elimination of some of the causes of race degeneraey and help toward the development of the superman which some future age must produce if the human race ultimately aehieves the noble destiny which the world's greatest philosophers have previsioned.

NUT GROWING IN PENNSYLVANIA FROM THE STANDPOINT OF THE EXPERIMENT STATION

By Prof. F. N. Fagan, State College, Pennsylvania

I think the majority of the older members will recall that about 10 or 12 years ago pressure was brought to bear upon the experiment station at State College regarding walnut growing in Pennsylvania. The situation then was a good deal like it is now. Our fruit growers had met with a rather disastrous year, many of them becoming pessimistic. We have lots of pessimistic fruit growers in Pennsylvania today. Prices are poor. There will be thousands of bushels of fruit not harvested in the state of Pennsylvania and not marketed. It is because competition is so keen with all types of vegetables—tomatoes, for instance, can be purchased in places in Pennsylvania for 25c a bushel. That situation existed about 10 years ago to such an extent that a few men, who had seen English walnut trees bearing good crops of nuts, immediately thought about the price of nuts back at Thanksgiving and Christmas time the year before, and said, "Why, there is a gold mine in that." They will plant these trees, which will grow anywhere, and then they will get rich.

There are about 5,000 bearing English walnut trees in the state of Pennsylvania. Most of them are seedlings. We are fortunate, I believe more so than many states, in having had for a good many year Mr. J. F. Jones whom we feel has done more work in the state of Pennsylvania than the experiment station has done. We cannot at the experiment station do very much in the breeding and testing of nuts because we are a little too far north. Then there are financial restrictions. It is our hope that sometime we will be able, probably, to come to this county, or some other southeastern county, and establish a farm not only for the interest of the nut industry, but also for the solving of some of the other problems in horticulture.

Do not think I am a pessimist in regard to horticulture in the state of Pennsylvania or in the eastern United States. I am not. It has just as bright a future today as it has ever had. The general fruit industry is just as bright as ever.

I am not a pessimist in regard to nut culture in the state of Pennsylvania. I am rather an optimist. At the present time, as we see the nut situation, we are not in a position to tell the farmers to plant 50 or 60 acres of any kind of nuts. We know that the English walnut will grow. We have living evidence that they will grow and produce crops. We have no black walnut groves that we know of in the state. It is doubtful if our hickories will ever compete with the pecan of the South, and personally I cannot see why they should until we can get some means of cracking them.

We stand about in this way at the experiment station. In southeastern Pennsylvania, probably reaching from Adams County, which lies just off the Susquehanna River, up through Dauphin County to Harrisburg, drawing a line to the Delaware River, we are recommending the planting of nuts for home use and in an experimental way, which might be developed on a larger scale eventually. We are encouraging the people to plant the English walnut and the black walnut, and in certain sections the filberts. There are too many waste areas in Pennsylvania to encourage the filbert on account of the blight, so it practically wipes out the probability of our waste land being planted to hazel nuts.

In the first place the landowners in the waste-land region of Pennsylvania are very doubtful if it would be economic for them to do so on account of fire, and also on account of the poor soil which is found in our waste land in our mountain section. It is doubtful whether it would be economical to take a high priced tree, which it is necessary to secure if we want to produce a good product, and plant it in such inaccessible places. We can see it in the fruit business so plainly. We have orchards in the state of Pennsylvania that are inaccessible. I know of one very well, back in the timber against the mountain side. They are now forcing the game commission to furnish them an eight-foot fence to put around that orchard to keep the deer from cleaning it up.

One unfamiliar with Pennsylvania will drive along the roadside and see the thousands of acres not used and think about planting them to nut trees, but it is foolish to do anything like that. So I might say our recommendations from the experiment station are about like this:

In southeastern Pennsylvania we are encouraging, and will keep

on encouraging, any individual to plant English walnuts and the black walnut. Throughout our mountain section we encourage nothing other than the black walnut. It is doubtful whether we should encourage them along that line except in the ordinary bottom land and farm land where the black walnut will grow. It is a great feeder. In Erie County we have a section that is comparable with New York and the territory where English walnuts will thrive successfully. The Hall tree stands there as evidence that the English walnut will grow. We have one seedling grove of 225 trees. In another location near Reading there are trees that were brought here from France. There are several similar groves scattered over the state. Unfortunately most of them are seedlings and have a varying crop.

I think you can readily see, in the fertile valley you have been in during the last few days, that it would be poor policy to tell the farmers of this section to plant these fertile fields, where they are growing crops of tobacco and corn, and feeding alfalfa and raising good dairy herds, to plant nut crops when you take into consideration the competition we are bound to meet with in the nuts from the South, the West, and from Brazil. They could probably use their land to better advantage for the production of some other crops that can be more readily consumed and that are in greater demand.

We are not going to advance very much until we can acquire some location in southeastern Pennsylvania where we can be sure of the climatic conditions that permit the trees to grow. We are outside of that belt, therefore it is not worth spending much time in trying experiments elsewhere. We hope eventually to be able to maintain a branch of the experiment farm in southeastern Pennsylvania, and of course when that time comes there will be experimenting in nut growing in this section.

Mr. Hershey: How many English walnut trees are there in the state?

Prof. Fagan: I think a little over 5,000 English walnut trees, mostly seedlings. We have had one bad winter since we made the enumeration and a good many were killed, but I think there are approximately that number in the state now.

The President: Did I understand you to say that you are ad-

vising farmers in all parts of the state to plant black walnuts in a limited way for profit?

Prof. Fagan: For home use only. They come in or write in and we try to tell them the type of soil to put them on, and we advise them to plant in a small way.

The President: How about the possibility of their cracking the black walnuts and selling the kernels?

Prof. Fagan: We have one valley in the state where they are doing this now. They generally market them in Baltimore. It is only pin money. They will never get rich at it.

The President: Did you say anything about what you are doing at the station with nut trees?

Prof. Fagan: We are trying to keep them alive. English walnuts have killed down mighty badly in the winter time. We are outside the territory where we can depend on growing English walnuts in our mountains.

The President: Are you doing well with any nuts there?

Prof. Fagan: Black walnuts only. Pecans growing fairly well, but they will never mature the nuts. The seasons are too cool and not long enough.

The President: Are you giving them as good care as Mr. Jones?

Prof. Fagan: No indeed. We feel that Mr. Jones is doing fine work in the state of Pennsylvania.

The President: Is it purely a question of finances?

Prof. Fagan: Yes, we might say it is a question of finances.

Dr. Zimmerman: I do not want to cast any insinuations on Dr. Fagan's remarks. But I am from Pennsylvania myself and I want to tell this association that I do not agree with him at all. It seems to me that if the state college can't do anything else it could at least create a sentiment for nut growing, and that they have not done. If you can't do anything yourself I wish you would encourage others. I believe there is as big opportunity in the northern part of Pennsyl-

vania for the black walnut and the shagbark hickory as there is in the South for the pecan.

Mr. Jones: What is the elevation at State College?

Prof. Fagan: 1200 feet running on up to 2400 feet. As far as the black walnut is concerned, it can be grown in any part of the state, but when it comes to the English walnut it is limited to southeastern Pennsylvania. Down through here they can be grown quite successfully. We are not opposed to its culture. We say that it is still in the experimental stage. I think Mr. Jones will acknowledge that here in this county, as to raising them for commercial purposes, it is more or less in an experimental stage. We do not know what is going to happen if we plant 300 or 400 acres in solid plantings. No one has ever done it in this section. We know we will meet with enemies. We do know the chestnut blight has wiped out the chestnuts in Pennsylvania. We do not want to encourage a man to plunge into this situation without giving it a good trial. I would rather see any man in the state of Pennsylvania start in with a 5-acre tract than a 100-acre one. He is going to be more successful in the end.

Mr. Jones: Are any of the real large fruit orchards paying?

Prof. Fagan: Yes, but not many are going to pay this year. The situation is pretty good, yet I look for a good many letters to come in regarding the planting of nut trees.

Mr. Jones: Would you about as soon chance 5 acres of black walnuts as peaches?

Prof. Fagan: I would rather take the chance of planting 5 acres of black walnuts with the state's money than a five-acre peach orchard, in our northern section. I believe that at the end of 20 years the black walnuts would pay better. Our peach orchards have had nine years of care and only returned two crops of peaches. But we can hardly go around and tell some fellow to plant six acres of Stabler walnuts and tell him it is going to be successful. Some of you may hark back to the dusting proposition in fruit orchards a few years ago, and if we had listened to all the people that came along selling dusters and dust we would have thrown away our sprayers. It took the Station 7 years to learn we could dust as well as spray. Why should the government

or experiment station tell a man to plunge into these things when we have nothing to base our suggestions on?

Dr. Smith: I would like to express the hope that Mr. Fagan will keep a record of the way black walnuts and hickory nuts perform in the vicinity of the college. He could use his students to keep such records of other parts of the state. In years to come I hope I may have your record for crops for a decade native to your locality.

Mr. Hershey: I just want to say in regard to creating sentiment, that my procedure of salesmanship is to advise people to plant a few trees to learn the business.

Mr. Bixby: Does the beech grow and bear well in your section?

Prof. Fagan: We have a few valleys in our section where they are growing. Right in our locality we seldom see them.

Mr. Bixby: What I am anxious to find out is if it is a good bearer.

PECAN GROWING IN INDIANA

By J. F. Wilkinson, Rockport, Indiana

While the pecan in this section is found growing along the Ohio river and its tributaries in Indiana, Illinois and Kentucky, and some of our now named varieties originated in Kentucky and Illinois, they are mostly in a radius of fifty miles of Evansville, Indiana, which is about the center of this group, and the pecan from this part has usually been spoken of as the Indiana pecan, including all growing in this territory, and I shall term them so now.

Pecan trees have been growing in this territory for centuries, as some of these giant old trees are living testimony today. They no doubt furnished food for the Indian long before the coming of the white man.

The early settlers and, sorry to say, many until recent years, did not regard them as valuable enough to leave. So many of them fell before the woodsman's ax to clear the ground for agricultural purposes, and today the only natural groves of any size are mostly on land undesirable for cultivation. Yet many corn fields in this valley are dotted with these trees that were left by some of the more far-sighted ones in clearing the land.

The product of these trees varies greatly. No two seedling pecan trees are exactly alike in their habits and production of nuts.

While about one-half of these seedling trees seldom bear a good crop, and a large majority of the remainder produce small pecans, there is now and then one towering far above all its neighbors as to the quality of nut it produces.

Having been born and reared within sight of many of these trees, this gave me the opportunity to study them early in my life, and long before the Northern Nut Growers Association was organized, or I had any thought of the pecan in the future, I was well aware of the fact that some trees were superior to others.

My first school days were spent in a school house surrounded by pecan trees, and if there is anything that will make a school boy's

mouth water it is when all his schoolmates are eating pecans at recess time, and he hasn't any. At that time if he has a chance to slip off under a pecan tree and steal pecans and resists the temptation, he can safely be trusted to any position in future life without bond.

It was during my early boyhood days that I learned, by watching the blue-jays and crows, to know which were the earliest ripening trees. These birds are also good judges of the shell and will be found working mostly on the trees bearing the thin shell nuts.

I might say here that my first school days were spent in the same school building with our now very enthusiastic and valuable member, Hon. T. P. Littlepage, in Enterprise, Indiana, where a session of the 1924 convention was held.

A number of years later, in 1910, Mr. Littlepage made a trip back to Enterprise and it was during a conversation there that he interested me in this line I am now following, searching for and propagating the best northern varieties of pecans. It is very largely due to his encouragement and assistance all along that I have been able to continue it. The public will never know how much valuable time and money Mr. Littlepage has spent in this cause that it might be a success, and had it not been for him the Indiana pecan would not be known today as it is.

Until 1910 only two of the now named varieties were known, the Indiana and Busseron, but Mr. Littlepage had heard of some good ones on Greenriver and in Posey County and took me with him on these trips, at which time the Major, Greenriver and Hoosier parent trees were located, though the Hoosier was propagated only for a year or two.

From that time on I became a real pecan enthusiast, as before I had only known the merits of the trees in this immediate vicinity. Since then I have been in almost every pecan grove of any consequence along the Ohio, Wabash, and Green river within fifty miles of Evansville, and others along the lower Ohio and on the Mississippi river.

For several years there have been propagated ten varieties (including the McAllister hickan) whose parent trees grow in the Evansville territory, and it is safe to say there are other fine trees in this section not yet located.

The locating of a parent tree is often no small or easy task. It is easy to hear of a good pecan tree in every neighborhood. But often after a tiresome walk through woods, weeds, and vines, crossing creeks and marshes, one arrives at the tree only to find the nut to be of medium quality. Such disappointments come to one a score of times for every really worthy tree he finds.

Mr. Littlepage, R. L. McCoy, Paul White and myself, have traveled thousands of miles at no little effort and expense, in some kind of a vehicle, motor boat, row boat or on foot, in locating the now named varieties and cutting bud and graftwood from them, and at all times looking for something better.

Trees of these varieties have gone from my nursery to every state in the northern pecan tree territory, to Canada and foreign countries, but I am sorry to say that few people in this neighborhood have taken any interest in planting them; what have been planted here are mostly just a few trees as a trial planting. There might just as well have been a number of bearing orchards here had the people listened to the good advice given by that great and good nut authority, the late E. A. Riehl, when in the meeting in Enterprise, Indiana, in August, 1914, he said, "It is time here for you people to wake up. You don't know what you have got. You are like people in many other sections of the country, they don't appreciate what they have got at their very doorways. If I were a young man, I would come here and plant pecan and walnut trees, but I am too old now to make such changes. In a few years you may remember what I have said. The walnuts are as profitable as anything else, and much more so than any farm crop you can grow. Nothing will produce as much value as nut crops, I am convinced of that."

This good advice might be applied to many sections of the country by growing the kind of nut trees best suited to its location. At the same time, Professor J. Russell Smith said, "Gentlemen, I do not see how anyone can live by these trees here and not realize they are a source of fortune. I can't understand how men can look up at them every year, gather and sell the nuts, and not realize they are a source of livelihood. They are all bending down with their fruit. It is marvelous, and they are certainly giving us evidence that the thing for us to do is to go ahead and reproduce them."

Col. Van Duzee said in part, "As Dr. Smith says, these people

here are living close to some of the most magnificent natural trees I have ever seen, and yet they will go and plant around their gardens trees that will do nothing in the world but produce shade. It seems to me there is room for the best kind of missionary work here. I have been very much pleased and very glad I came, and if I were not thoroughly tied up in a section I think is more adapted to nut growing, I should come up here and undertake to do something in this section, for I see great possibilities."

Similar talks were made by others without the effect it should have had.

Many had long ago found that pecan trees would not come true to seed planted, after waiting many years for these seedling trees to come into bearing, and are too doubtful of a budded or grafted tree to pay the price these trees must be sold at. Consequently those who plant are setting only a very few trees on trial, before venturing on a commercial scale.

Mr. J. A. Hopkins, cashier of the Old Rockport Bank, Rockport, Indiana, nine years ago planted one tree given him by R. L. McCoy, and three years later planted four more that I gave him. The other day he told me that the nine-year-old tree had over a bushel of pecans on it, and the four six-year-old ones had from a few to a gallon each, and remarked that had he planted a five-acre orchard at the time he planted his first tree he could now quit his bank job. He gave me an order for thirty trees, enough to fill all available space on his town lots.

My young trees are bearing wonderfully this year. Some are fairly bending under their load of nuts, as are some of my neighbors' who purchased some of my trees several years ago.

I have a Busseron tree now thirteen years old, the crop on which is estimated by good pecan judges to be from seventy-five to one hundred pounds, and other trees younger are bearing correspondingly well.

The bearing of these few trees in this neighborhood will be responsible for more pecan trees being planted in Spencer County during the next twelve months than have been planted here in the last five years.

With the exception of the meeting of the Northern Nut Growers

Association, of which the reports reach very few of the public, and magazine articles, there has been little to encourage pecan tree planting except the nurseryman's effort, which the public looks on as sales talk.

What the prospective commercial planter wants and should have is reliable information as to planting, results, bearing records, and data on pecan growing in general. This has never been available from any source except the nurseryman and the few early planters, then in a limited way.

Very often I am asked by some correspondent as to where there is a northern pecan orchard in bearing, and to give him the names of some of the largest plantings where he can obtain information from the planter.

What the northern pecan industry needs is a test and experimental orchard in southern Indiana, where a complete record of trees as to planting, results, cost per acre of planting, and bringing orchard into bearing, blooming dates, and bearing records of the different varieties are kept, and this information available to the public at all times, and where the many interested prospective planters who visit this section for information can see the facts demonstrated and settle the points in question for themselves at once, instead of each one doing his own experimenting by making a trial planting and losing several years of valuable time waiting for these trees to come into bearing.

The President: I will ask the committee on resolutions to make its report.

Prof. Neilson: One of the first things I want to present is an expression of appreciation of the services of our retiring President, Dr. Deming. As founder of this association Dr. Deming has done excellent work in the organization of its activities. He was secretary for fifteen years and efficiently served the association as president for the past year. He has been most enthusiastic in all that he undertook and has shown a patience and persistence that is highly commendable. We regret to learn that he is unable to continue as our president and take this occasion to express our sense of loss over his inability to serve us for another year. While he is unable to continue as our president we know that he will remain an active member as

long as his health permits, and we hope to see him at many future meetings.

Our efficient secretary, Dr. Colby, has also found it necessary to relinquish his position because of pressure of other official work. Dr. Colby has carried on the work of the past year under difficulties, which are only understood by those in similar positions in the public service. From personal experience as one engaged in the public service of Canada, I quite appreciate the difficulties of his position. He has served the association in a very efficient manner and it is a matter of deep regret to your committee that he is unable to continue as our secretary.

An important feature of Dr. Colby's work was the establishment of short courses on nut culture at a few of the universities in the Middle West. I am told that two day courses were held at Columbia, Mo., and at Ames, Ia. These courses were well attended and a great deal of interest was aroused in nut culture. Plans have also been made to carry on similar courses at several other universities in the Middle West. If short courses could be given at all of our universities it would greatly stimulate interest in the culture of nut trees.

Our annual conventions are generally events of pleasure and profitable instruction, but occasionally our meetings are tinged with feelings of sadness because of the death of valued members. During the past year this association lost two old and active members in the persons of Mr. J. G. Rush of Lancaster, Penna., and Mr. Mason J. Niblack of Vincennes, Ind.

I also want to refer to the tragic death of Mr. Harry Jones, one who was not a member of our association, but nevertheless was able to do a valuable service in the cause of nut growing. As superintendent of Mr. J. F. Jones' nut nursery he did valuable work in propagation and was an efficient helper in the management of this excellent concern. His sudden and tragic death in an aeroplane accident was a great shock to us who knew him and I am sure you will join with your committee in expressing our sympathy to Mr. and Mrs. Jones and family.

We wish to express our appreciation to the hotel management for the use of this convention hall and for courteous and satisfactory services to all who attended our meetings.

We also desire to express to Mr. J. F. Jones and family our appreciation of courtesies shown the association delegates while visiting the nursery and nut tree plantations. Mr. Jones' plantation is a practical example of what can be done in the culture of nut trees in the North and should be an inspiration to greater effort to all who were privileged to see this excellent plantation.

We also desire to express our thanks to the officers of the Keystone Pecan Co. for an interesting entertainment. Those of us who visited their plant were much interested in what we saw and appreciate the courtesy of the officers in giving us an opportunity to inspect their plant and in providing entertainment for the evening.

Mr. Littlepage: It has been said by some distinguished person that "Any great institution is but the lengthened shadow of one man." I doubt if many of us here today realize just exactly how much this applies to the nut industry and how much we are indebted to men like Mason J. Niblack of Vincennes, Indiana, and Mr. J. G. Rush of Lancaster, Pa. Mr. Niblack was the first, so far as I know, to take any great interest in the pecans of the North. He was the first to take an exhibit of these nuts to the National Nut Growers meeting. He got the Agricultural College of Indiana interested, and offered a prize for the best pecan at a meeting at Mt. Vernon, Indiana, many years ago before the Northern Nut Growers Association was organized.

Mr. Niblack grew up on the banks of the Wabash among the pecan trees. He was both a lawyer and farmer. I know from experience that this makes a very absorbing combination. He was at one time Speaker of the House of Representatives of Indiana, but in no position and in no walk of life was he so busy that he could not take time to mix with his many friends and enjoy the real things of life.

Mr. J. G. Rush is the man to whom we are very much indebted for our interest in the culture of the English walnut in the East. If he never did anything more than get Mr. Jones to come up into this country and show what can be done here he would be entitled to a place in our memory. But he was more than all this. He was a good, lovable, fine character.

These men have gone from us but it seems to me that it is most appropriate that we should take a moment to pay our respects to the memory of these two pioneers in nut culture.

Life is made of sunshine and shadows. These men probably had their share of both but on the "Shadowy shores of death the sea of trouble casts no waves."

The President: You have heard the report of the committee on resolutions. If no comments are to be made, this report, together with Mr. Littlepage's remarks, will become a part of the minutes of the meeting.

The next thing to be considered is the place for the next meeting. We have here a telegram from the Talbot County Chamber of Commerce, Easton, Md., inviting us to come there next year. I will read the telegram:

> The Talbot County Chamber of Commerce cordially invites you to hold your next annual convention at Easton, Md. Considerable interest in nut culture as evidenced by old and new plantings would be interesting to your members, as would also a visit to Canterbury Nurseries here, which we believe to be the largest boxwood nursery in the world. Talbot County, the heart of the Great Eastern Shore, extends you a cordial invitation.
>
> Henry P. Turner, Pres.

Other places mentioned are Canada.—Prof. Neilson wishes us sometime to come to Canada.—Washington, D. C., where we have already met four times and where Mr. Littlepage's plantings are of great interest, and Mr. Bixby's place on Long Island.

Mr. Bixby: I think, Mr. President, if we can decide now the place of the next meeting it would be very advantageous.

Mr. Reed: I move that the invitation to Easton, Md., be accepted. I am in a way the father of it. I am in favor of going to Easton. The Eastern Shore of Maryland to my mind offers the greatest opportunity for development in nut growing. Climatic conditions there are very favorable. There are a good many plantings of nut trees there. There are a great many large estates owned mostly by wealthy people. The people are experimenting in nut trees. They are growing English walnuts and Japanese walnuts, and this nursery that is mentioned is going into nut culture. The president wrote to California for the Franquette walnut and is going into the business. We will

find much to see and be able to do some missionary work. So Mr. President I move to accept the invitation.

The President: Easton as a place for our next meeting is open for discussion.

Prof. Neilson: With reference to my expressed desire to have this association visit Canada, I would like to say that there is one reason I did not advise you to go there next year. I thought it would be better to wait a year or so until some of the trees that we are taking in from this country and other countries have established themselves and we have something very definite to show you. A good many of the native nut trees thrive quite well and we also have some interesting examples of introduced nut trees. If the association could arrange to have the meeting in the city of Toronto so that it will follow the exhibition it will be more worth while than if you come at another time. Those of you who have attended the exhibition will probably agree that is some show. I hope two years from this summer you people will come.

Dr. Smith: The Easton situation has this in its favor—it is strictly a rural locality and Mr. Reed says there are a lot of rich people there. Probably 30 or 40 real live farmers would come in. I would approve that place and I second the motion.

The President: It has been moved and seconded that the next place of meeting be Easton, Md.

The Secretary: Just as a matter of record I want to say that perhaps in 1928 we could very profitably hold a meeting some place in Iowa in connection with the Central States Exposition. The Exposition is held every two years.

Mr. Littlepage: I agree, Mr. President, with Mr. Reed's recommendation. I endorse it very strongly. We should keep in mind, perhaps, the year following, or one year very soon, going to southern Illinois or southern Indiana again. Grayville, Ill, and southern Indiana have very great attraction on account of their pecans. The greatest inspiration after all is to see these pecan trees growing. Illinois has them in abundance. They have fine trees and fine nuts.

Dr. Smith: I should just like to say, in connection with the ideas of Dr. Colby and Mr. Littlepage, that the meeting in Iowa might be

two days instead of three, and one day we could stop off in southern Indiana, say on the way home.

(There was a unanimous vote that Easton, Md., be the place of the next meeting).

Mr. Littlepage: I suggest that the Secretary wire the Chamber of Commerce the acceptance of their invitation.

The President: The next is the date for the meeting at Easton, Md.

Mr. Reed: This is something we thrash over every year and usually arrive at the same conclusion, that there is only one time of the year when we are free to go, and that is shortly before the universities open, so that the professors can be with us, and before courts begin and after the summer hot weather, and as late in the season as possible so we can see the nuts to best advantage. It comes down to the middle of September every year. I will make the motion that we decide upon the middle of September, the exact dates to be left with the executive committee co-operating with the Chamber of Commerce as to date.

Motion seconded.

The President: All in favor please signify.

(There was a unanimous vote in favor of the above motion).

The President: There is one other item of business that should be brought up before we proceed with the program, and I have asked Mr. Spencer to bring up the matter of planting an arboretum in Decatur.

Mr. Spencer: It has been said several times on the floor of this convention that a living example of results is the best demonstration and greatest encouragement for further action. Desiring that my own home town should have a little encouragement in the planting of nut trees, I wrote the president of our Park Board the following letter:

Decatur, Illinois,
August 24, 1926.

My dear Mr. Schaub:

The Northern Nut Growers Association has honored me by electing me Vice-President for Illinois, which office I have held two years.

Last year at the St. Louis convention they made me one of the directors of the national organization. I give you this information so that you may understand that outside of my interest in Decatur, I am naturally anxious to forward the efforts of the association in the extension of knowledge of the value of nut trees.

I expect to attend the national convention, which will be held in Lancaster, Pennsylvania, September 14, 15, 16 and I would like to report to that convention that the Decatur Park Board will establish in one of the parks a planting of nut trees. Sooner or later some of the cities will do this, and there is no reason why Decatur, which is practically in the heart of the nut belt of the Central West, should not have a collection of trees which will thrive in this climate so that the general public and the generations coming on may actually see the trees growing and producing fruit.

Many of the nut trees are the handsomest shade trees we have, and if we can get the farmers interested, as well as those who own small places in the city, in the cultivation of nut trees, we can have shade trees that are valuable as an ornament to a property and also supply most delicious food for our tables.

As far as I know at the present time, the black walnut, the hickory, the mockernut, (a variety of hickory nut), the pecan, the chestnut, the filbert, the Japanese walnut, the butternut, the hazelnut, the hard-shell almond, as well as the papaw and the persimmon, will all grow in this vicinity. These last two are not nuts, but are generally sold by the nurserymen who make a specialty of nut trees.

Between now and the 5th of September, I wish you would let me know about how much money you would be willing to put into a nut arboretum in one of the parks. Then I can take it up with a number of very distinguished specialists in nut culture and find out the best varieties of these different nuts, so that the collection at Decatur will be something of which your organization and the citizens generally will be proud. I think it is safe to say that good trees, budded so as to produce the variety desired, will cost on the average about $1.50 each. This figure is my estimate. I think probably it may vary a little from that, but not much.

Henry D. Spencer.

In order to know what could be done, and in order to get before the Park Board with some such information as an attorney would want to have to go before similar authorities to hold up his theory of a case, I wrote letters to Mr. Jones, Mr. Snyder, Mr. Wilkinson and Miss Amelia Riehl. I sent a similar letter to Mr. Littlepage, Dr. Deming and Dr. Morris, excepting request as to what trees they had for sale. I also wrote to Judge Potter of Illinois and Mr. Bixby. All of these people have given me ammunition which will enable me to make a

vigorous attack on the Park Board. In this connection I would like to read the letter from Miss Riehl, which is a very interesting one to me. She is carrying on the business which was established by her father, and that business is the most successful chestnut enterprise in Illinois if not in the United States.

Godfrey, Illinois,
August 28, 1926.

Dear Mr. Spencer:

Your idea of a nut arboretum in the city park is indeed a splendid one. If people could have the opportunity of seeing the trees growing and bearing before deciding what to plant, they would be spared many a disappointment. The nut industry being comparatively young, somebody has got to do some pioneering. I can understand that it would be much less expensive, on the whole, and progress would be made much quicker, if your plan could be carried out, than if each planter had to do his own experimenting. And it need not be very expensive. Half a dozen trees of each species,—two each of the three best varieties. would be enough to show what they can do. I think Dr. Anderson would be a good one to ask about the cost of the after care of such a grove.

First of all I would plant black walnuts and chestnuts, because it has been proven that they bear regular and profitable crops in this section of the country. Next, I would get some of the best hickories and pecan-hickory hybrids (hiccans). Judging from our grafting experiences last spring these latter are very promising. I do not think so well of planting the true pecans here though of course we should do some experimenting. Those most likely to be profitable are the varieties that originated in Iowa and Indiana. (Ask Mr. Snyder and Mr. Wilkinson). By all means try some filberts. They seem to succeed in a great variety of soils and locations, and also climates. The Japanese walnuts grow and bear very well here and add interest to a collection, but there is no commercial demand for them. By rights, in an arboretum that is for the benefit of the public, it would be well to plant some of everything, including Japanese heartnuts, hard-shell almonds, hazelnuts. butternuts, and even English walnuts.

I started with the most promising kinds, from a commercial point of view, and ended with those we know least about. The same applies to your own problem. If I were after money, rather than knowledge and experience, I would stick pretty closely to walnuts and chestnuts, and let the other fellows do the experimenting, although I do believe there is a promising future for other nuts also, when people wake up to their value.

In regard to what is best to grow between the trees, I can give little in the way of advice, as that is a question we have not yet settled

for ourselves. Much depends on the kind of land,—whether it is flat or rolling. In level fields garden truck or corn might be all right; and on hillsides, sod. We thought of starting alfalfa in one of our groves that has been cultivated for years, and the ground washes badly in the winter rains. But I find, on closer study, that nut trees, (especially chestnuts), require an acid soil, while alfalfa, (along with all the clovers), needs lime to do its best. Now I am up a stump. If I were going to be at the Lancaster convention I'd try to get that question answered by some one of "those who know." Let me know if you learn something along that line. I am beginning to think that by the time we receive the report of the meeting it will be ancient history.

All these trees I think can best be supplied by Mr. Jones, of Lancaster; excepting the chestnuts. We had few stocks on which to graft last spring and used them for father's oldest named varieties—Fuller, Progress, Champion and Parry, and Mr. Endicott's Boone. These are now sturdy little trees about three feet tall that would likely do very well if planted this fall. We are asking two and one-half dollars ($2.50) each for them. I believe Mr. Snyder also has some trees of these varieties.

Now I believe I have answered all of your questions to the best of my knowledge. I hope you succeed in getting the arboretum started. It would be of a lot more practical value than most of the things that people spend money for in public parks.

Amelia Riehl.

Now, Mr. President, I went before the President of the Park Board and gave him the information I had, and also told him of the number of trees that had been planted by different friends of mine in Decatur, and he authorized me to say at this convention that at the present time they had contracted for 500 trees of various kinds in the parks, and that will be as many trees as their present force will be able to plant this fall. Decatur has purchased a great many acres of ground and I think will have something like a thousand acres around the city, but he has authorized me to say to this convention that they will purchase 10 trees of each variety and plant them in the spring in one group in one of the parks for the purpose of making a display where visitors may come and see them all at one time instead of having them scattered over a number of these parks where it will be difficult for visitors to see them at one time. Now that is a chance for the association to start in Illinois a demonstration of what we stand for. I want to go back to my home town, Decatur, and say that this convention has recommended such and such a planting in Decatur. Three of the

Park Commissioners are personal friends of mine, and I have no doubt but what the matter can be carried through. Supplementing the remarks of Mr. Bixby, Mr. Jones, Mr. Wilkinson and Mr. Littlepage, they have given me nuts, and I propose to take all of these samples and place them on the table in the library of Decatur so the general public can see them, and then through the press, through Mr. Schaub's paper, have the public notified that this exhibition is there and they can see for themselves what can be produced in Macon County. The county is only 555 square miles. There are 20,000 acres of land in that county alone that is good for nothing but pasture. If any small quantity of that land can be put into nut bearing forests it will be a credit to this association, the value of which cannot be refuted.

The Secretary: Illinois is a big state and we are proud of it. I am in favor of anything Mr. Spencer says in favor of the arboretum.

The President: The subject that Mr. Spencer has told us about is one of the objects of our association, that is to secure the planting of nut trees in places where the trees will have perpetual care. The subject is open for discussion. It is a large one and I do not know that we will be able to give him any definite information as to the number of nut trees that should be planted. The subject is open for discussion and the passing of any resolution.

Dr. Smith: Mr. Chairman, I move that the following resolution be adopted:

> "The Northern Nut Growers Association strongly commends Mr. Spencer's idea of a collection of nut trees in the parks of Decatur, believing the matter will be one of great interest to the people of the town, a matter of civic beauty, with great possibilities of large economic value for the future."

Dr. Zimmerman: I second the motion.

(Resolution passed by unanimous vote).

Dr. Zimmerman: It appears to me that as you are in the chestnut tree district out there it might be wise to just keep in mind the possibility of bringing in the chestnut blight during this work.

Mr. Spencer: There are no chestnut trees in Illinois that were not raised in Illinois.

Dr. Zimmerman: It is possible to bring it in through other things. I would advise you to keep it in mind.

The President: Is there anything else we can do to further this arboretum in Illinois?

Mr. Spencer: I believe there is nothing more.

The President: The secretary will make a few announcements before we adjourn.

The Secretary: I want to call your attention to a few nuts received by Prof. Neilson since the opening of this convention.

I have a telegram from Senator Penny and Mr. Linton stating that on account of their political engagements in Michigan they were unable to be with us at this time.

I have a letter from Mr. Snyder recommending that we offer prizes individually or collectively at the state fairs.

I hope you will be pleasantly surprised to find your annual report awaiting you upon your arrival home.

I have a paper from Dr. McAtee, Assistant in Charge of the U. S. Biological Survey which was received too late to include in the program. I will simply read it in title and include it in our report—"Birds and Mammals in Relation to Nuts in the Northeastern United States."

On account of failure of Mr. Hershey to secure his slides on short notice he will not be able to give us his address this morning.

The President: This brings to a close all of the set formal business of the association. Is there any further business to be brought before the convention is adjourned? If there is no further business to come before the convention, the motion to adjourn is in order.

(It was moved and seconded that the convention adjourn).

APPENDIX

BUSINESS MEETING

Business Meeting of the Association Held September 14, 1926, 7:45 P. M., With President W. C. Deming in the Chair.

Mr. Bixby brought up the matter of reimbursing the secretary for expenses incurred in arranging for and attending the annual meeting, including the present one. The motion made by Mr. Bixby and seconded by Mr. Littlepage that such expenses be paid was passed unanimously.

Mr. Littlepage then introduced and discussed the subject of raising funds for defraying the expenses of the association. The following members pledged different amounts toward the expenses of the Association:—

Dr. Deming, Mr. Littlepage, Mr. Jones, Mr. Bixby, Mr. Olcott, Dr. Smith, Dr. Morris, Mr. Garber, Mr. Neilson, Mr. Walker, Mr. Green, Dr. Theis, Mr. Spencer and Mr. Paden. Mr. Ellis had contributed earlier in the meeting.

Mr. Olcott, Mr. Bixby, Mr. Hershey and Mr. Neilson spoke as to ways and means for securing new members. Dr. Smith suggested that the annual report be made a year book including, for example, the records of the annual performance of nut trees in different sections.

Mr. Olcott asked for a committee of twelve to bring in a report at the next meeting as to the future activities of the association.

Mr. Neilson advocated a nation wide survey of nut trees.

Dr. Morris spoke regarding the possibilities of interesting some scientific foundation in the work of the association.

The motion was made by Dr. Smith, after some explanation on his part, that a committee be appointed with Mr. Littlepage as chairman to compile and send out a circular letter on black walnut culture to the county agents in walnut territory. Considerable discussion followed. Mr. Olcott moved that the Northern Nut Growers Association

in convention assembled in Lancaster, Pennsylvania, September 14, 1926, go on record as favoring the planting of black walnuts generally in black walnut territory, and that the association prepare a folder of condensed information on the culture of the black walnut.

The motion of Dr. Smith was seconded and passed. The committee was made up of Mr. Littlepage as chairman with Mr. Bixby, Mr. Jones, Dr. Smith and the Secretary**.

Meeting adjourned.

A. S. COLBY, Secretary.

**Secretary's Note:—The committee met after the business session but learned through Mr. Reed that county agents, because of government restrictions, probably could not act under such a letter. After considerable discussion it was decided that the committee could and should prepare a brief illustrated circular on black walnut culture for general distribution.

During the remainder of the session committee meetings were held and the first draft of a circular prepared. The circular was promptly printed and generally distributed.

(The following is a copy of the circular as issued, omitting the two cuts).

Bulletin 6

NORTHERN NUT GROWERS' ASSOCIATION

The Northern Nut Growers' Association has been studying the varieties, propagation and growth of nut trees for seventeen years. It now recommends the planting in orchard form of the better varieties of grafted and budded native American black walnuts in those parts of the country where the tree grows naturally.

Of course, in this recommendation it is expected that no one will plant his whole farm to black walnuts any more than he would to apple trees, also that no one will put a substantial portion of his money into distant nut plantings which he cannot personally superintend; in short, that good sense will be exercised in planting black walnuts as in planting any other crop.

Some of the reasons for recommending the planting of black walnuts are as follows:

Black walnuts are good food.

The kernels sell wholesale at from 50 cent to a dollar or more a pound.

There is now a great demand for walnut kernels and there are not enough kernels available to meet this demand, which comes from nut shops, candy-makers, ice-cream-makers, and makers of cake and nut breads. The black walnut holds its flavor when cooked.

The Northern Nut Growers' Association believes that this demand will increase.

There is already a substantial and growing business in cracking out and selling the kernels of wild walnuts. Getting out the kernels, however, is slow and expensive when wild nuts are used.

A few unusual walnut trees that produce very fine nuts have been located in different parts of the United States and have been given variety names. They are now being propagated by budding and grafting. Several of these have borne crops of sufficient size and quality to justify our recommendation of their commercial planting. This is true of the varieties known as Stabler, Ohio, and Thomas. The most important thing about the varieties is the shape of the inside of the shell which permits the kernels to come out in whole quarters, and often in whole halves. Other varieties of great promise are being tried out, and it is likely that many trees, worthy of propagation, are at present unknown to the Association. Sample of nuts of these trees should be sent to the Secretary of the Association.

Black walnut trees need to have rich soil. If it is not rich naturally, it should be made so. In such soil they grow rapidly and bear early. They need to be planted and tended when young with as much care as

apples. Under these conditions they bear as soon as apple trees. Grafted black walnut trees need to be transplanted intelligently and with care. There is not sufficient space in this bulletin to give detailed planting instructions. They are to be found however in Bulletin No. 5 of the Association, which may be obtained from the Secretary for 50 cents each, postpaid.

If walnuts lie in the hull until the hull becomes soft, wet, and black, the juice penetrates the shell and darkens the kernel. If hulled and dried as soon as ripe, the kernels are of a light waxy color, much more attractive to buyers and of much better flavor.

The fine varieties of black walnuts noted above crack out well with the hammer. Inventors, however, have been working on the problem of doing this by machinery, and already there are one or more devices that are an improvement on the hammer, and it is to be expected that the next few years will show substantial improvement in cracking machinery.

Black walnut wood is one of the highest-priced woods grown in the United States. Even the stumps are being dug up to be made into veneers. An acre of old mature black walnut trees has a present sale value as great or greater than the present value of farm land in many parts of the United States. Since we are cutting timber in this country about four times as fast as it is being grown, it seems inevitable that its price must rise, and many authorities are now recommending the planting of black walnut for timber alone.

Black walnuts, like apples and other fruits, will not come true from seed. That is to say, if black walnuts which crack out well, are thin shelled, and fine flavored are planted, the trees that grow will almost surely bear nuts which are deficient in these qualities and hardly worth raising. Therefore, in order to get superior walnuts it is necessary to set budded or grafted trees.

Names of nurserymen specializing in budded and grafted walnut trees will be sent to anyone writing to the Secretary of the Northern Nut Growers' Association, Mr. Henry D. Spencer, Decatur, Ill., and enclosing a stamp for reply.

FIELD MEETING

On the morning of Wednesday, Sept. 15, the convention visited the nut nurseries and orchards of Mr. J. F. Jones at Willow Street, three miles from Lancaster. Mr. Jones conducted the members and visitors to the points of interest and Mr. C. A. Reed gave a careful description of them in passing. At noon Mrs. Jones served an excellent luncheon to all the guests in Mr. Jones' very large packing shed where, also, the implements used in transplanting and digging nut trees were inspected. After luncheon a group photograph was taken, demonstrations in budding and grafting were given by Mr. Jones, Prof. Neilson and Mr. Hershey, and a visit was made to the former home of Mr. J. G. Rush at Willow Street. Here many of the Persian walnut trees planted by Mr. Rush were seen loaded with a fine crop of nuts.

The following is a copy of a descriptive list given each guest by Mr. Jones in order that the tour of the orchards might be intelligently followed:

Beginning in yard near house:

No. 1. Marquardt pecan. Seedling pecan set 1919 and grafted at once.

No. 2. Holden walnut budded on Japan walnut stock. Planted 1916.

No. 3. Constantinople tree hazel, corylus colurna. Planted 1920.

Nos. 4 & 5. Rush hazel on own roots. Though a very hardy plant, these, like most of the filberts, suffered from the severe cold in March.

No. 6. Rush hazel grafted on a seedling of Barcelona filbert.

No. 7. Ridenhower hard-shell almonds and Texas Prolific budded on peach. Worked together to get hybrids from natural cross pollination. Texas Prolific is not perfectly self pollinating so that many of the nuts set are cross pollinated, and produce hybrids.

No. 8. Nebo walnut, a local sort, planted 1913. Note good union of the English and black walnut.

Nos. 9 & 10. Greenriver pecan. Planted 1913. Trees of this variety have borne very sparingly as yet with me.

No. 11. Tree hazel, corylus colurna. Grown from seed from Rochester parks. A very rapid grower and beautiful tree. Nut about the size of the native hazel or possibly a little larger.

No. 12. Weiker shagbark hickory. Planted 1915. Bore a few nuts 1925.

Test orchard east of house. Most of these trees planted 1914 as seedlings to be grafted over, and grafted two to four years later. Some had to be reworked one or more times, hence the trees vary in age. Some few trees, after being grafted several times unsuccessfully with scions from old trees, were cut out. We did not know as much about grafting then as now, of course, but if one wanted a good orchard of grafted trees the trees should be nursery grown and set out rather than to try to grow them by planting seedlings.

Nos. 13 & 14. Holden walnut, from Hilton, N. Y. A fine nut but shy bearer.

Nos. 15 & 16. Alpine walnut. A large but smooth nut and a very hardy tree.

No. 17. Rush walnut. Originated with the late J. G. Rush.

No. 18. Sinclair walnut, from Harford Co., Md. Evidently a Mayette seedling and is a very nice nut. Bears a good crop every year. Is being propagated.

Nos. 19 & 20. Wiltz Mayette. These trees had been grafted several times previously and were rather poor stocks.

No. 21. Cut-leaved walnut. An ornamental variety but bears a good nut.

No. 22. Burlington walnut, from E. Burlington, N. J. Alpine type.

Nos. 23, 24 & 25. Hall walnut, from Erie Co., Pa. These were set out as one year trees, 1914. A very large nut and prolific bearer, but the nut is rough shelled and the kernel often not filling the shell.

No. 26. Boston walnut, from Boston, Mass. Nut very thin shelled and good, but has the fault of the nut varying greatly in size.

Nos. 27 & 28. Weaver walnut, from Georgetown, Washington, D. C.

No. 29. A Pomeroy walnut topworked late, spring 1925, without previous cutting back to control the sap. It is hardly practical to work over trees of this size and they had best be cut out and smaller trees

set in their place. Often such trees are devitalized to such an extent that they are worthless, even if the grafting is a success. It can be done if properly followed up. Black walnut is much more successfully worked over.

No. 30. Potomac walnut from Washington, D. C. A rather small nut of the Chaberte type. A small tree, planted 1920.

No. 31. Meylan walnut. A French sort. Like Mayette and Franquette is late vegetating and escapes late spring freezes which sometimes catch early vegetating varieties.

No. 32. Ohio walnut. Bore over a bushel of hulled nuts 1925. This variety is bearing well from Canada to Texas. Original tree northern Ohio.

No. 33. Aiken butternut. Set 1920. A rather small, but good cracking nut from Grassmere, New Hampshire. Grafted on butternut stock.

Nos. 34 & 35. Kirtland shagbark. Original tree Yalesville, Conn. Grafted on pecan 1922.

No. 36. Rockville hican, from Rockville. Mo. One of the finest pecan-shellbark hybrids.

Nos. 37, 38 & 39. Niblack pecan. Original tree near Vincennes, Ind.

No. 40. Indiana pecan. Original tree on Wabash River, north of Vincennes.

Nos. 41 & 42. Koontz pecan, from Vernon Co., Mo. These trees were well loaded with nutlets but did not hold them, for some reason. The Missouri pecan is a different type from the Indiana varieties as will be seen by these trees. They are typical of the Missouri pecans.

Nos. 43 & 44. Busseron pecan. Original tree near the Indiana in Knox Co., Indiana. Supposed to be the parent of Indiana. These two trees bearing.

Nos. 45, 46, 47 & 48. Butterick pecan. Original tree near Grayville, Ill.

Nos. 49, 50 & 51. Greenriver pecan. Original tree Henderson Co., Kentucky.

Nos. 52, 53, 54, 55, 56 & 57. Posey pecan. No. 56 bearing this year.

Nos. 58, 59 & 60. Major pecan. Original tree Henderson Co., Ky.

No. 62. Milford shagbark, from Milford, Conn. Grafted on pecan 1920.

No. 63. Corrugated or Hinton pecan. Also from Henderson Co., Kentucky.

Nos. 64, 65 & 66. Laney hybrid shagbark, from Rochester parks. One of the thinnest shelled shagbark-bitternut hybrids.

No. 67. Eureka walnut. Scions from Stockton, Cal. Grafted 1918.

Nos. 68 & 69. Ten Eyck walnut. Original tree So. Plainfield, N. J.

No. 70. Faust heartnut, from Bamberg, S. C. Grafted 1918.

Nos. 71, 72 & 73. Thomas walnut. Trees planted 1918.

Nos. 74, 75 & 76. Seedling heartnut trees, grown from extra select seed nuts taken out of a shipment from Japan, 1917. No. 76 has reproduced the type very well, but the other two are only ordinary siebold nuts, entirely unlike the seed planted.

No. 77. Stabler walnut, grafted 1918 on an established wild tree.

Nos. 78 & 79. Ohio walnut planted 1918.

No. 80. Deming butternut, from Connecticut. Grew very vigorously when planted but was cut for bud wood two years and was probably hurt.

No. 81. Peanut walnut, from northern Ohio. Some of the nuts are one lobed and the kernel inclined to be roundish in form, hence the name.

No. 82. Pleas hybrid pecan from Oklahoma. A natural pecan-bitternut hybrid. A very pretty tree and bears well, usually, though this year seems to be its "off" year, as with the pecans.

Nos. 83 & 84. Lancaster heart nut. A fine nut but the tree vegetates too early and is sometimes caught and loses its crop by late freezes.

No. 85. Seedlings Texas Prolific almond cross pollinated with Ridenhower almond, now in their second year. From tree No. 7.

No. 86. Seedling from Faust heartnut hand pollinated with pollen of the Sinclair walnut. One plant now in its third year from seed.

No 87. Seven plants, seed from same tree as No. 86 above, hand pollinated with pollen of the Ohio black walnut.

Nos. 88 & 89. Deming butternut trees, bearing quite young. No.

89 is bearing its third consecutive crop, having borne two nuts the next season after being grafted in nursery.

No. 90. Deming black walnut. Peculiar in that the new growth is red and the inner bark and pellicle covering the kernel reddish.

Nos. 92 & 93. Ginkgo. Valued for its nuts in China but not considered edible here. Makes a good shade tree.

No. 94. Hatch bitternut from Iowa. A bitternut with an edible kernel of fair quality. Probably of value for hybridizing.

No. 95. Beaver hybrid shagbark topworked on a large bitternut tree. Fourteen grafts were set and all grew. Has been bearing several years.

Nos. 96, 97 & 98. Three rows hybrid hazels, now in their third year from seed. Transplanted 1926. From Rush hazel seed pollinated by hand with DuChilly filbert pollen.

No. 99. One row, Rush hazel x Cosford filbert, hybrids transplanted spring 1926. Now in their fifth year from seed. Several of these plants bore a pound of nuts each last year.

No. 100. One row hybrid hazel, same parentage and age as the preceding. Had the tree digger run under them last spring and some taken out. A few others planted in.

No. 101. One row, same parentage as the preceding except a few planted in, but are two years older. A few plants of the Italian Red X Rush planted in this row. Although Cosford is a rather small nut the hybrids of this cross have given the largest nuts so far.

No. 102. West end this row Rush hazel X Barcelona hybrids. East end Italian Red and Giant de Halles pollen on the Rush hazel.

No. 103. Rush X Barcelona. The hybrids of this cross usually bear well.

No. 104. Fairbanks hybrid shagbark grafted on bitternut.

No. 105. Abundance beech. Original tree Martinsville, Ind. This looked well till this year. The location is wet and this, with the wet season, has probably hurt it.

No. 106. Grupe pecan, from Lincoln, Neb., worked on mockernut. Has not done very well, though has had no attention.

No. 107. Marquardt hybrid pecan, topworked on mockernut, presumably.

No. 108. Beaver hybrid shagbark worked on bitternut.

No. 109. Large bitternut tree top-worked to the Beaver hybrid shagbark. Fourteen grafts were set and all grew, quickly forming a good head. Grafted May, 1919. Has been bearing several years.

No. 110. Bitternut tree grafted to Fairbanks hybrid. Grew vigorously and bore 124 nuts the third year. The tree died the following year.

No. 111. Bitternut grafted to Butterick pecan. Still holds on, but has not thrived and is evidently not at home on the bitternut stock.

No. 112. Kirtland shagbark hickory. Original tree Yalesville, Conn. Top-worked on mockernut presumably. Has borne well every year but one since the third year. That year the staminate bloom was removed and the nutlets pollinated with Schley pecan pollen from south. This was not successful as no nuts set.

No. 113. Garretson persimmon.

No. 114. Lambert persimmon.

No. 115. Josephine persimmon.

No. 116. Early Golden persimmon.

No. 117. Galoway black walnut graft in its second year.

No. 118. Greene black walnut graft in its second year.

Nos. 119 & 120. Ohio black walnut bearing in mother block.

Nos. 121 & 122. Peanut black walnut bearing in mother block.

No. 123. Lick Run black walnut graft in its second year.

Nos. 124, 125, 126, 127, 128, 129, 130, 131 & 132. Thomas black walnut bearing in mother block.

No. 133. Thomas black walnut, bearing quite small, in the nursery row.

Nos. 134, 135 & 136. Young grafted black walnut trees bearing heavily. Label got lost. Probably the McCoy variety.

No. 137. Seedlings the Rush hazel pollinated with DuChilly filbert pollen.

No. 138. Seedlings Rush hazel pollinated with White Aveline filbert pollen.

No. 139. Seedlings Rush hazel pollinated with Italian Red filbert pollen.

No. 140. Seedlings Rush hazel pollinated with pollen of one of its own hybrids, No. 58. These plants are therefore 3-4 hazel and 1-4 European filbert.

No. 141. Same as above except pollen from No. 200 was used in this cross.

No. 142. Seedlings from Italian Red filbert pollinated with corylus colurna pollen from the trees at Highland Park, Rochester, N. Y.

No. 143. Juglans mandshurica, Asiatic butternut.

No. 144. Corylus colurna pollen on the hybrid hazel No. 200.

No. 145. Corylus colurna pollen on the hybrid hazel No. 100. Judging from the looks of the plants now, it is doubtful if any of the seedlings where corylus colurna pollen was used are true hybrids of that species. I thought earlier they were.

No. 146. Hardy chinese persimmon from seed sent me by Dr. J. Russell Smith while in China on his trip around the world.

Nos. 147, 148, 149, 150, 151, 152, 153, 154, 155 & 156. Marquardt hybrid pecan. It has been stated that nut trees can not be made to succeed when planted along road-sides. These trees have had no care except a light mulch when planted. The same is true of other trees in this row.

No. 157. Lancaster heartnut. A natural black walnut topworked.

Nos. 158 & 159. Stanley shellbark hickory on pecan. This is a fine variety of the big bottom shellbark, carya laciniosa.

Nos. 160, 161, 162, 163, 164, 165, 166 & 167. Bates heartnut from South Carolina.

Nos. 168, 169, 170, 171, 172 & 173. Ritchey heartnut from Virginia.

No. 174. Faust heartnut from South Carolina.

No. 175. Indiana pecan.

No. 176. Niblack pecan.

No. 177. Pleas hybrid pecan.

No. 178. Siers hybrid hickory. Siers is a natural cross or hybrid of the mockernut and bitternut. One would not expect much from this cross, yet the Siers is a very fine nut and a very pretty tree.

No. 179. Beaver hickory grafted on bitternut.

No. 180. Laney hybrid shagbark hickory on bitternut.

Trees below at the Mylin place, just across the road:

No. 181. Burlington walnut. Original tree Burlington, N. J.

No. 182. Old Mayette, Grenoble type. A fine nut but not very productive.

No. 183. Wiltz Mayette. Grafted on a natural black walnut spring 1920.

Implements used in transplanting and digging nut trees:

No. 184. Implement for transplanting young trees. Is pulled with the little Avery Friction Drive Tractor. This friction drive affords a very low gear ratio so that the tractor can be run very slowly, which is necessary in lining out plants so close together. Two men sit in the seats and set the plants in behind the opener as it moves forward. With this machine we line out about 22,000 plants a day and do it better than can be done in hand dibbering as it is not necessary to cut back the roots.

No. 185. Larger transplanter. This opens a larger trench and runs as deep as 24 inches. Used in transplanting larger trees. This is pulled by the Bates Tractor, through cables and blocks to reduce the speed. The trees are set in behind the opener as the machine moves forward.

No. 186. Firmer or presser. This follows the transplanters and firms the earth well about the roots. This machine, without the weight of the driver, weighs 1500 lbs. This firming is very important in the transplanting of all trees and plants and especially so with nut trees. We lose practically none at all when the earth is well firmed about the roots.

No. 187. Avery Friction Drive Tractor, used for pulling transplanter.

No. 188. Tree digger. Used for the smaller nut trees and for fruit trees.

No. 189. Larger tree digger. Used for nut trees. Runs 26 inches deep, severing the roots. Trees are then lifted with four digging irons, and four men using the same.

No. 190. Wire cables used in pulling large digger. Blocks are used to reduce the pull, when digging nut trees.

No. 191. Wire cables run on these pulleys. Tractor moves at right angles to digger which is some distance away, sometimes the length of the cables, one thousand feet.

No. 192. Bates Tractor. We have two of these and sometimes use both of them in digging nut trees. Draw pull, both tractors, 9000 lbs. They will probably exceed this rating.

BANQUET

On the evening of September 16 the convention and other persons, to the number of about one hundred, were the guests of the Keystone Pecan Products Laboratory at Manheim. An inspection was first made of the well equipped laboratory and factory where the machinery for cracking the pecans and for preparing and hermetically packing the products was seen under the guidance of the President, Mr. Elam G. Hess and the Vice-President, Mr. E. B. Knowles. Afterward a banquet was served to all the guests in the new laboratory. Dr. Robert T. Morris was toastmaster and the speakers were Mr. Knowles, Mr. Hess, Mr. Graham, Dr. J. Russell Smith, Mr. Littlepage, Mr. Spencer and Mr. Bixby. Mr. Knowles, Mr. Hess and Mr. Graham spoke of the origin, purpose and accomplishments of the laboratory. The banquet was perfectly appointed under the direction of Mrs. Hess and admirably served by the laboratory technicians in attractive uniforms.

The following is a copy of the menu:

MENU

Olives — Pickles

Fruit Cup

Creole Pecan Celery Loaf — White Sauce

Peas in Patties — Buttered Carrots

Peaches

Butterfly Pecan Salad — Pecan Cheese Sticks

Pecano Ice Cream — Southern Lizzies

Salted Pecans

Pecan Mints — Pecan Fudge

Demi-Tasse

JOHN GALL RUSH

Mr. Rush joined our association in 1911, during the first year of its organization, and remained a member until he died, Saturday, August 21st, 1926, at the age of 83 years.

He was born July 30th, 1843, in Pequea Township, Lancaster County, Pennsylvania, his father, David, being a descendant of Peter Rush, who came from Switzerland, and his mother Susan, whose maiden name was Gall, being of German descent.

His people were farmers, and he himself followed in their footsteps. He became interested in growing first apples and then peaches about forty years ago.

His interest in nut growing dates from before 1890, when the Paragon chestnut was first introduced, of which, and other chestnuts, he had specimens at the old farm.

About the year 1899 Mr. Rush bought two seedling English walnut trees from Daniel Herr of Lancaster. One of these trees, which bore a bushel of nuts at ten years old, was named by Mr. Jones the "Rush" walnut. From this tree Mr. Rush sent scions for grafting in the spring of 1902, to Mr. Jones at Monticello, Florida. Mr. Rush planted the trees resulting from the grafting in 1903, and this is believed to be the date of the first planting of grafted eastern varieties of the English walnut.

The next nut with which he experimented appears to have been the American chinquapin, of which he found a specimen, said to have been about 35 feet high and very productive, near Colemanville, Lancaster County. He sent specimens of this nut to Mr. John R. Parry of Parry, N. Y., who mentions it in his book on nut culture.

Mr. Jones' acquaintance with Mr. Rush dates from the time when he read Mr. Parry's book and wrote to Mr. Rush. His chinquapin was then propagated and sold by Mr. Jones. The eastern specimens of this tree so disseminated have all perished with the blight, so far as known, but specimens are still preserved at Mr. Riehl's place in Godfrey, Ill., and elsewhere in the west.

His first experiments with the hazel were in growing fifty plants of the American species that he dug near New Providence, and the hazel that now bears his name was the only one of these that he found worthy of propagation.

Mr. Rush was also the first to have the Weiker hickory propagated by grafting.

It was through his acquaintance with Mr. Rush that Mr. Jones first came to Lancaster and later in 1912 established his present nursery in Willowstreet.

Mr. Rush was himself a successful propagator of nut trees, using the ring budding method, and for some time conducted a nut nursery at his place in West Willow.

He married Martha Brennaman of Strasburg in 1867. She died in 1924. Two children survive them, Martin B. Rush of New Providence, and Mary LeFevre of Washington, D. C.

Mr. Rush moved to West Willow about twenty-five years ago, and at his former home there his nut trees, now nearing the prime of their vigor and productiveness, constitute his monument and testimony to his foresightedness as a pioneer in the art of nut growing. This association owes him its gratitude and respect for his vision and his works.

LETTER FROM S. W. SNYDER, VICE-PRESIDENT, CENTER POINT, IOWA

New organization and the necessary advertising to get attention cost a lot of money. It is my experience that suggests that we can better make use of organizations already in existence, by which we may obtain all the advertising we need, and that absolutely free.

Our state, county, and local fairs I have found to be willing and anxious, when approached on the subject, to include a nut premium list in their fair books, and if the premium list is gotten up in a suitable way to cover the nut growing interests of the locality in which the fair is held, we can accomplish all that can be desired without any extra expense.

To bring out newly discovered varieties special cash premiums should be offered and I find this to be one of the best means by which to bring out all the desirable varieties of a given locality.

I have just lately returned from our state fair where I acted as superintendent and judge of the nut department. Through this source I have just located a very worthwhile shagbark hickory. This nut has made its appearance at our state fair for the second time and just came to my attention at this last fair. I have not seen the tree or as yet gotten in touch with the owner. The nut has not yet been named but I am going to suggest that it be named for the owner of the tree, which if agreeable to them will be Doolittle.

Through a similar source I have located a pecan tree that is fully fifty miles farther north than any other native pecan tree yet discovered. This tree is out in the interior of Iowa away from the large streams where the most northern pecan trees heretofore have been found. This all comes through the free advertising obtained in the state, county and local fairs.

I can name quite a long list of the best nuts now known in our state that were located in this same way. The Elmer and Upton

pecans; the Sayer, Eversman, Hill, Tama Queen, and Iowa shellbark hickories; the Schwartz, Hine, and Jumbo walnuts the Sherwood and Buckley butternut; the Winkler, Pleasant Grove, and Hardin hazelnuts; the Shaul, Schinnerling, Stratford, Higgin, and this new one I am going to call Doolittle, shagbark hickories have all come to our notice through our fair associations.

If all the fairs located in the timber belt of our country would include nut lists and some special cash premiums offered by private individuals, doubtless in a short time every valuable nut now growing within our country would be discovered and brought to our attention.

I believe this to be one of the most important things that our association might take up and induce these organizations to do the advertising for us and thereby discover many valuable nuts not yet brought to our attention.

BIRDS AND MAMMALS IN RELATION TO NUTS IN THE NORTHEASTERN STATES

By Dr. W. L. McAtee, Assistant in Charge, Food Habits Research, Biological Survey

U. S. Department of Agriculture, Washington, D. C.

The word nut, one of indefinite application, witness the term pine-nut, is restricted for the purposes of the present paper to fruits of hickory, walnut, hazel, chestnut, chinquapin, beech, and oak. These fruits, like all food items available to birds and mammals, are utilized more or less in proportion to their abundance, by vegetatarian species that are large enough to grind them up, or swallow them whole, and by certain smaller creatures that have special equipment for penetrating their hard walls.

Acorns, most numerous in individuals as well as in kinds, are consumed more frequently than the other nuts by birds and mammals. Twenty-seven species of northeastern birds are known to feed upon acorns, those doing so most often being in the order of their importance, the crow, blue jay, purple grackle, brown thrasher, ruffed grouse, bobwhite, and chewink among land birds, and the mallard and wood duck among waterfowl. The wild turkey, a voracious feeder upon acorns, is scarcely a bird of the northeastern states today.

The acorn-eating birds use a variety of feeding methods, the ducks, grouse, and bobwhite swallowing the acorns whole, the crow, bluejay, woodpeckers, and nuthatches splitting them with their strong beaks, the cardinal and chewink cutting them open by sheer biting power, and the purple grackle opening them by a process peculiar to itself. The grackle has a hardened ridge projecting downward from the roof of its mouth against which an acorn is firmly pressed while it is revolved by action of the lower mandible and tongue. The shell is weakened by this manipulation and soon breaks into very neatly severed halves.

Wild animals of different kinds are fond of acorns, the black bear greedily grinding them up, the white-tailed deer feeding upon them freely at times, and the squirrels, chipmunks, and woods mice,

regularly. These latter animals belonging to the tribe of gnawers add a method to those noted before of gaining access to the meat of at least the harder shelled nuts. By patient rasping with their chisel-like teeth they gnaw a hole large enough to permit extraction of the meat. Empty shells bearing such holes are familiar objects in woodlands where nuts abound.

Chestnuts, now largely extirpated from the Northeastern States, were formerly eaten by several species of birds which are on the list of acorn consumers also. The blue jay probably consumed more chestnuts than did any other bird. Chinquapins and hazelnuts each are known to be eaten by a few kinds of birds, while beech-nuts are favored by a much longer list. The crow, the blue jay, and the red-headed woodpecker are the principal avian consumers of beechnuts and in the northern parts of its range the redhead's staying for the winter seems to depend entirely on whether there is a good crop of these nuts.

Beechnuts now and chestnuts in their day, like the other comparatively thin-shelled nuts were favorites with mice and squirrels also, and the hard-shelled sorts such as walnuts and hickory nuts are consumed only by these indefatigable gnawers. A few wild ducks swallow hickory nuts whole, the pileated, our largest woodpecker, breaks them up, and the cardinal may occasionally bite into one of the thinner shelled kinds.

English walnuts, especially while still green, are attacked by crows and purple grackles. This nut seems to be about the only one commercially grown in the northeastern states, hence the depredations upon it by the birds mentioned are the only ones by either birds or mammals on nuts in this region that have unquestioned economic significance.

Public interest in nuts in the Northeast is chiefly in conservation of a reasonable stock of wild nut trees, and in planting when necessary to insure this result. From these points of view the relations of wild birds and mammals to nuts are scarcely to be criticized. Trees live so long and produce so many nuts that there is a vast surplus beyond the number that can ever figure in replacements. This surplus may much better be consumed by the birds and mammals than to go to waste, especially since among these animals are species which play an

important role in distributing nuts and thus extending the range of the trees. Nuts are heavy fruits not aided by wind dispersal; they are very likely to drop directly under the parent tree and find conditions for survival unfavorable from the first. However, if lent legs or wings as they often are by the squirrels or jays they may reach a spot far from the parent tree that is favorable for their growth.

Habitual storers of food like the mice, the squirrels, the blue jay, woodpeekers, and nuthatches in season work incessantly at their self-appointed tasks, but never recover and consume more than a fraction of the nuts they hide.

To sum up: In the northeastern states there is only one type of actual damage done to the nut crop, namely destruction of immature English walnuts, and the nut-feeding birds and mammals, which always leave some for seed. distribute those in such a way as to win for themselves the rank of chief disseminators of nut-bearing plants. On the whole then they are to be regarded as friends of nut culture and of forestry in general.

REPORT ON THE RESULTS OF THE WALNUT SURVEY CONDUCTED BY THE MINISTRY OF AGRICULTURE AND FISHERIES IN ENGLAND AND WALES IN 1924 AND 1925

Forwarded by Howard Spence, Vice-President for England

Though single walnut trees are common in all parts of England and Wales, walnuts are not grown on a commercial scale in this country, and the total home crop is quite insufficient to supply the home markets which are in consequence dependent on imported supplies. Moreover, many of our walnut trees produce nuts of poor quality, a fact which is not surprising when it is remembered that most of the trees growing in this country have been raised from nuts and are in effect seedlings from parents known or unknown. In other countries, it has been found possible to improve the walnut industry by working scions taken from proved trees on to known stocks, and thus by vegetative means to raise a number of trees which are known in advance to produce superior quality nuts. It cannot be claimed that the same method of procedure would hold good for this country, nor is it known whether the right kinds of stocks for Great Britain are in existence.*

In these circumstances, the Ministry decided in 1924 to make an enquiry into the general character of the walnuts grown in this country in order to obtain a closer knowledge of existing types and to ascertain the location of the best existing varieties with a view to their subsequent vegetative propagation and wider distribution. Through the medium of County Horticultural Officers, Inspectors of the Ministry, and otherwise, samples of matured nuts were collected from many parts of the country during 1924 and again during 1925 and were critically examined by Mr. Howard Spence of Ainsdale, Southport, who very kindly offered his services to the Ministry in this connection. The following salient points from Mr. Spence's reports will, it is hoped, be of interest.

Samples of nuts from the 1924 crop of some 160 trees were examined by Mr. Spence. The weather of that season, characterized by

*(With this I do not agree.—H. S.)

excess rainfall and lack of sunshine, was very unfavorable to the development of the walnut crop. Light crops were recorded in most districts and malformation and distortion of shell were very prevalent in the samples received. After exposure for a week or two to normal indoor conditions, the kernels of the majority of the nuts became shrivelled and withered, and the cause of this shrinkage was found to be a shortage of the normal proportion of oil in the nuts. This deficiency was accompanied in most cases by excessive sugariness and lack of the true walnut flavour. In spite of the generally disappointing results of this year's enquiry, mainly attributable to the weather conditions, the fact emerged that some, though but a very small number, of home grown trees are capable even in so unfavorable a year of producing nuts with the desired characteristics in greater or lesser degree, viz: good colour, size, contour, percentage of kernel and of oil, flavour, sealing, crop yield and absence of astringency and excessive moisture—and approximating to the high standard of Californian and continental types.

In 1925, a season of more normal climatic conditions, the home walnut crop was much better both in quantity and quality than in 1924. Practically the whole of the samples received this year were free from the malformation noted in the previous year, and in many cases trees which produced small crops of poor nuts in the previous years were found in 1925 to have borne large crops of better nuts. The examination of the 1925 samples confirmed the fact that the percentage of walnut oil in the nut is the prime factor in determining quality; it also brought out another factor second only in importance, viz: the original proportion of water present in the fresh kernel, which in the case of a number of the samples was excessive so that the shrinkage on partial drying was serious.

The enquiry has so far revealed a dozen types which pass the standard in these two essential factors and which are a great improvement on the large majority of home grown walnuts. Amongst these are 2 or 3 varieties excellent for home consumption but too small for the market; one only is deemed worthy of wider general distribution. Scions of these have been kindly supplied for propagation trials mainly at East Malling Research Station, where experimental work is now proceeding on the subject of stocks and their standardization, the best methods of propagation for home conditions, and also to de-

termine the quality of walnuts grown here from the best foreign grafted varieties. For the purpose of these experiments, scion wood from the best varieties grown in California and in Italy has been obtained, and a number of the best types of nuts from other foreign sources have been planted.

The information gained by the enquiry proves beyond doubt the possibility of growing, at least in the southern counties, walnuts possessing the qualities essential to enable them to compare favourably with foreign types, but no one variety has yet been found growing in this country in which all the desired features are combined. The field covered so far has been comparatively limited, and it is now desired to extend the enquiry so as to cover as large a number as possible of the walnut trees growing in this country.

County Horticultural Officers are cordially invited to co-operate with the Ministry in this extended enquiry by bringing the matter to the notice of all growers of walnut trees. In order that the actual examination of samples may be kept within reasonable limits, growers are asked to submit their nuts to the simple preliminary test indicated in the enclosed memorandum, before forwarding any for critical examination. Further copies of the memorandum and form of report will gladly be supplied to any county officer or to individual growers on application to the Ministry of Agriculture and Fisheries, 10 Whitehall Place, London, S. W. 1.

WALNUT SURVEY, 1926

"A walnut variety which is considered by the owner or contributor to be worth examination should be preliminarily tested by him in the following way—one or two pounds of the variety meantime also being put aside in a cold cellar or outhouse for despatch if the nuts tested appear to reach the desired standard.

"Fully expose two or three dozen walnuts, in a single layer, to the temperature of a living room for ten days. If the majority of the nuts when cracked at the end of this time show a PLUMP, PRACTICALLY UNSHRIVELLED KERNEL the variety is well worth examination and not less than one pound of the undried walnuts put aside should at once be forwarded. If, on the other hand, the exposed walnuts are found to show largely shriveled kernels they do not reach the minimum standard desired for propagation."

With the walnuts which pass this test, the details indicated in attached form should be supplied.

Qualifications Desired

(1) One pound weight should not contain more than 50 nuts as a maximum in the fresh condition.

(2) Three-fourths of the sample (*all* of which however should be forwarded) should not pass through a square hole of 1 1-8 inch side.

(3) The nuts should be well sealed and should not show separation of the two halves when pressed along the sutural ridge between the thumb and first finger.

(4) The flavour of the nut must be *rich* (and not merely crisp and palatable) and should not be very astringent when masticated fully.

(5) The nuts should be reasonably uniform in shape and not contain many which are distorted or malformed.

(6) The shell should be fairly thick.

(7) To preserve a good colour and avoid development of mould the nuts should be separated from the husk as soon after falling as possible.

A variety which shows any special quality of value, e. g. unusually well filled nuts, very rich flavour, attractive appearance, heavy crop, etc., but which otherwise does not conform to the desired standard should also be forwarded for classification, with a note drawing attention to its special merit.

Samples and reports should be sent direct to Mr. H. Spence, The Red House, Ainsdale, Southport, Lancs.

The following information should, so far as possible, be supplied with each sample and forwarded to Mr. H. Spence, The Red House, Ainsdale, Southport, Lancs:

I. Identification letter and number (suitably the initials of the sender and consecutive numbers) corresponding to those on the label used for the despatch of the sample.

II. The name and address of owner or occupier.

III. Exact situation of tree.

IV. Approximate age of tree.

V. Height of tree.

VI. Spread of tree.

VII. Average annual weight of crop, and if variable from year to year.

VIII. Approximately date of flowering.

IX. Approximate date when nuts are ripe.

X. Distance from nearest other walnut tree or trees.

XI. Local name, if any.

XII. Local opinion of quality of the nut.

XIII. Has the preliminary test been carried out?

XIV. Have the nuts any special quality of value, e. g. unusually well filled nuts, very rich flavour, attractive appearance, heavy crop, etc.?

Ministry of Agriculture and Fisheries, 10 Whitehall Place, S. W. 1.

EXHIBITS

Persian *(English)* Walnut

Alpine, J. F. Jones
Cut Leafed, J. F. Jones
Rush, J. F. Jones
Eureka, J. F. Jones
Hall, J. F. Jones
Sinclair, J. F. Jones
Wiltz Mayette, J. F. Jones
Chinese Walnut—N. E. China, J. Hershey
English Walnut—Seedling, New Holland, Pa., J. Hershey.
Rush, J. Hershey
Hall, J. Hershey
J. Regia—Seedling, J. Hershey
J. Regia—Boyerstown, Pa., J. Hershey
J. Regia—Downington, Pa., J. Hershey
J. Regia—Boyerstown, Pa., J. Hershey
J. Regia—Groff, Paradise, Pa., J. Hershey

Black Walnut

Adams, G. H. Corsan
Stabler, (one lobe type), J. F. Jones
Stabler—(perfect), J. F. Jones
Ten Eyck, J. F. Jones
Thomas, J. F. Jones
Thomas, and Stabler, J. F. Wilkinson, Rockport, Ind.
J. nigra, Seedling, J. Hershey
J. nigra, Stabler, J. Hershey
J. nigra, Thomas, J. Hershey

Hickory

Hales, J. F. Jones
Kirtland, J. F. Jones
Glover, J. F. Glover, Shelton, Conn., per J. F. Jones.
Shagbark—Sq. nut No. 145, J. F. Jones
Vest, J. F. Jones
Zimmerman No. 27
Western Shellbark, J. Hershey
W. Shellbark, J. Hershey
Eversham, J. Hershey
W. Shellbark, Sayer

Hickory Hybrids

Pleas, J. F. Jones
Beaver, J. F. Jones
Siers, J. F. Jones
Rockville, J. F. Jones
Hickory x Pecan hybrid, grown on the E. A. Riehl Farm, Godfrey, Ill.
Fairbanks, J. Hershey
Hicoria ovata x Hiconia cordiformis, J. Hershey

Japanese Walnut

Bates, J. F. Jones
Faust, J. F. Jones

Faust Heartnut, J. F. Jones
Stranger, J. F. Jones
Lancaster, J. F. Jones
Ritchie, J. F. Jones
J. Sieboldiana, J. Hershey

Pecan

Posey, J. F. Jones
Busseron, J. F. Jones
Marquardt, J. F. Jones
Olivaeformis x laciniosa, J. F. Jones
Ohio, J. F. Jones
Pecans (cured 1925), J. F. Wilkinson, Rockport, Ind.
Greenriver, J. F. Wilkinson, Rockport, Ind.
Busseron, J. F. Wilkinson
Kentucky, J. F. Wilkinson
Butterick, J. F. Wilkinson
Posey, J. F. Wilkinson
Major, J. F. Wilkinson
McCallister, J. F. Wilkinson
Pecans, Green 1926, J. F. Wilkinson
Busseron, J. F. Wilkinson
Indiana, J. F. Wilkinson
Greenriver, J. F. Wilkinson
Posey, J. Hershey

Filberts *(Including Hazels)*

Hybrid Hazels, 1, 2, 3, 4, 5, J. F. Jones
Filbert, J. F. Jones
Daviana, J. F. Jones
2 Barcelona, J. F. Jones
3 Barcelona, J. F. Jones
Filbert, Giant de Halle, J. Hershey
Filbert, Barcelona, J. Hershey
Filbert—Cosford, J. Hershey
Native Hazel, Winkler, J. Hershey
Filbert—Noce Lunghe, J. Hershey
Filbert, 1-2, T. P. Littlepage

Chestnut

Fuller, grown by E. A. Riehl, Alton, Ill., Dept. of Hort. Univ. of Ill.
Boone, grown by E. A. Riehl, Alton, Ill., Dept. of Hort. Univ. of Ill.
J. Sieboldiana Seedling, Butternut type, J. Hershey

Tung-oil Nut

Tung Oil Nut, Aleurites fordi, J. Hershey

Willard G. Bixby, Long Island, showed Faust, Stranger, Lancaster, Ritchie, and an unnamed heartnut, Alpine and Hall Persian walnuts.

Prof. J. A. Neilson, Vineland, Ontario, showed sixty-six plates of Canadian nuts, an impressive exhibition.

Dr. W. C. Deming showed a plate of Glover shagbark hickory nuts from the parent tree.

The Nut Buster Co. of Harrisburg, Pa., showed a hand cracker for nuts of any kind and size.

Through the kindness of the Hershey Chocolate Co. and of the J. H. Kellogg Co., samples of their products were distributed to the members and guests.

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Mrs. J. F. Jones and daughter.
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Prof. J. A. Neilson and wife, associate horticulturist, Vineland, Ont.
Prof. Willis F. Theiss, Bucknell University, Lewisburg, Pa.
Dr. J. Russell Smith, Columbia University, New York City.
Dr. Robert T. Morris, College of Physicians and Surgeons, New York City.
Dr. G. A. Zimmerman, Piketown, Pa.
Dr. F. L. Baum, Boyertown, Pa.
T. P. Littlepage, Washington, D. C.
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J. Ford Wilkinson, Rockford, Ill.
Paul White, Bowie, Md.
Ralph T. Olcott, Editor American Nut Journal, Rochester, N. Y.
C. A. Reed, associate pomologist, U. S. D. A., and Mrs. Reed, Washington, D. C.
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NORTHERN NUT GROWERS ASSOCIATION
(INCORPORATED)

REPORT

OF THE PROCEEDINGS AT THE

EIGHTEENTH ANNUAL MEETING

EASTON, MD.

SEPTEMBER 15, 16, 1927

NORTHERN NUT GROWERS ASSOCIATION

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REPORT

OF THE PROCEEDINGS AT THE

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Coyle, David C., 10 Miller Place, Bronxville
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Gager, Dr. C. Stewart, Botanical Gardens, Brooklyn
Garber, Hugh G., Room 403A, 75 Fulton St., New York
Hodgson, Casper W., World Book Co., Yonkers
*Huntington, A. M., 1 E. 89th St., New York City
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MacDaniels, S. H., College of Agriculture, Ithaca
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Northern New York Developing Co., 32 Nassau St., New York City.
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Hile, Anthony, Curwensville

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*Life Member

Hess, Elam G., Manheim
Hammond, Dr. J. T., 3rd, Newton
Jenkins, Charles F., Farm Journal, Philadelphia
Johnson, Mrs. Georgia P., Orchard Knob Farm, Dallas
*Jones, J. F., Box 527, Lancaster
Kaufmann, M. M., Clarion
Knife, Irving P., 5. E. Airy St., Norristown
Knowles, E. B., 145 E. Clay St., Lancaster
Krebs, Harry B., Mercersburg
Leach, Will, Cornell Bldg., Scranton
Moorehead, A. D., Louisiana
Paden, Riley W., R. No. 2, Enon Valley
Raab, W. L., Box 41, Dallastown
Ross, Adam A., 121 Bleddyn Road, Ardmore
Rittenhouse, Dr. J. S., Hill Croft Fruit Farm, Lorane
*Rick, John, 438 Penn. Square, Reading
Schultz, Oscar S., 142 N. Reading Ave., Boyertown
Smith, Dr. J. Russell, Swarthmore
Smedley, Samuel L., R. F. D. No. 1, Newton Sq.
Stein, Charles E., 208 N. 2nd St., Lewisburg
Theiss, Lewis Edwin, Munsey
Wehrle, R. W., Indiana
Wilhelm, Dr. Edward A., Clarion
*Wister, John C., Clarkson & Wister Sts., Germantown
Woodward, Laura E., Westchester
Zimmerman, Dr. G. A., The Fernwood, Piketown

RHODE ISLAND
Allen, Phillip, 178 Dorrance St., Providence
Arnold, Henry N., 42 Waterman St., Providence

TEXAS
Duerler, Alfred, 224 W. Commerce St., San Antonio
Goodnight, Chas., Goodnight

VERMONT
Aldrich, A. W., R. F. D. No. 3, Springfield
Dana, J. C., Woodstock
Ellis, Zenas H., Fair Haven
Holbrook, F. C., Brattleboro

VIRGINIA
Ammon, S. Von, Ridgethorpe, Colemans Falls
Harris Dewitt S., Capital Landing Road, R. F. D. No. 3, Williamsburg
Keeler, Miss Grace M., Norfolk

WASHINGTON
Berg, D. H., Nooksack
Richardson, J. B., Lakeside

WEST VIRGINIA
Brooks, Fred E., French Creek
Cannaday, Dr. J. E., Box 693, Charleston
Hartzell, D. F., Shepherdstown

WISCONSIN
Holden, Louis Edward, Beloit
Mongin, F. J., R. No. 6, Green Bay

CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association, Incorporated.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at

the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay three dollars annually, or four dollars and a half including a year's subscription to the American Nut Journal. Contributing members shall pay ten dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

There shall be an annual, non-voting, membership, with privilege of the annual report, for all County Agents, Agricultural College and Experiment Station Officials and Employes, State Foresters, U. S. Department of Agriculture Officials, Editors of Agricultural Periodicals, College and High School Students, Boy Scouts, Girl Scouts or Camp Fire Girls and similar organizations, on payment of one dollar as annual dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the association, or with the first day of the calendar quarter

preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Article V

Members shall be sent a notification of annual dues at the time they are due, and if not paid within two months, they shall be sent a *second notice,* telling them that they are not in good standing on account of non-payment of dues, and are not entitled to receive the annual report.

At the end of thirty days from the sending of the second notice, *a third notice* shall be sent notifying such members that unless dues are paid within ten days from receipt of this notice, their names will be dropped from the rolls for non-payment of dues.

REPORT OF THE PROCEEDINGS

at the

EIGHTEENTH ANNUAL CONVENTION

of the

NORTHERN NUT GROWERS ASSOCIATION

(Incorporated)

September 15 and 16, 1927

Held in the

COURT HOUSE

EASTON, MARYLAND

Chairman—President S. W. Snyder

The meeting was called to order at 10:00 a. m. by the President of the Association, introducing Mr. G. Layton Grier, President of the Del-Mar-Va Eastern Shore Association, who delivered the Address of Welcome.

Mr. G. Layton Grier:

Gentlemen of the Convention: It gives me a great deal of pleasure to welcome the Northern Nut Growers' Association to the Peninsula. We have long needed this conference. Most people are, I presume, as unfortunately situated as myself. When I came to consider the subject of nuts I found much to my chagrin that my thoughts naturally ran along humorous rather than constructive lines, and yet I know that, wherever you find them, nuts are properly a matter of serious

concern. They challenge our attention without regard to whether they are running wild or growing wild. The attendance at this conference in itself guarantees the dignity and economic importance of your general theme. Indeed, it is not often that we are able to convene in one room a group of men, many of whom are not only nationally but internationally known. I note with much pleasure the attendance of Dr. J. Russell Smith, one of the greatest living authorities on Economic Geography. I am sure that when he has spoken on the general theme of Nut Trees Suitable to the Chesapeake Country, we will have had the final word upon the subject. Dr. Cory, Maryland State Entomologist, Willard Bixby of New York, C. A. Reed of the Bureau of Plant Industry, Washington, Dr. Robert T. Morris of New York, J. F. Jones of Lancaster, Conrad Vollertsen, and last but not least Dr. E. C. Auchter of the University of Maryland, are all men whose contributions would dignify any conference. I therefore feel that this gathering is a real event in the economic life of our Peninsula. It is an event because it heralds our growing appreciation of the scientist and the value of the research activities for which he is responsible.

It is one of the ironies of our times that while agriculturists and horticulturists are as deeply indebted to the scientists as are the members of any other calling or profession, agriculture is the one occupation in which pure science is apparently held in the least regard. In manufacture the practical operator recognizes the value of scientific formulas. Far seeing men are appropriating not only thousands but millions of dollars to the support of industrial research. The growers of our commercial crops, however, are still largely inclined to proceed by rule of thumb methods, operating on a trial and error basis, thereby undoubtedly adding very materially to the cost of overhead.

Of course we are, through various governments and state growers, and our colleges and universities, conducting horticultural and agricultural research activities of great value. However, pure science is still regarded with suspicion in many rural circles.

I, of course, have no notion concerning the nut producing possibilities of the Peninsula. Indeed, I presume that is what we are here to find out. I realize, as Dr. Smith has pointed out, that we Americans do not take the tree crops seriously. We overlook the fact almost entirely that nuts are food. Indeed, our attitude toward these tree

crops is generally recreational. We sally forth in the autumn to gather nuts as a diversion. Our expeditions are designed to please the children. When we buy nuts occasionally in the stores we classify them as luxuries. "Nuts and candy" are, I believe, still traditionally correct Christmas gifts for the youngsters. That fact is indicative of their status.

And yet, for all of that, we are really consuming immense quantities of nuts. It astonishes me to learn that in 1926 we imported 22,679,000 pounds of shelled walnuts and 21,000,000 pounds of walnuts that were not shelled. How many dollars this represents I do not know, but unquestionably millions.

It is not my intention to indulge in a technical discussion as there are experts in attendance to advise you. I am simply trying to make it clear what this conference has already done for me. It has challenged my interest and has awakened me to a realization of the possible economic values with which you are dealing. It should and no doubt will awaken an interest in others whose knowledge of the subject is no greater than mine.

All of this is by way of saying, that down here on the Peninsula we actually know very little about nut culture. Certainly we have no local data upon which to base a claim that we can grow nuts commercially and at a profit.

We know that we can grow nut trees, and that these trees bear a varying harvest. The unregulated tree appears to be rather undependable. Our problem, I presume, is to find out whether we can make our trees reliable servants.

The man who invents or perfects a new commercial crop for the Peninsula deserves a place in the annals of the great. What we need is a nut growing Burbank. Some day someone will bring forth a walnut that can be cracked without the aid of a trip hammer; a walnut in which it is possible to find the meat without securing a search warrant or the assistance of a private detective agency. We have the paper shelled pecan, and I hope that as time goes by we will evolve paper shells on all the nuts we grow.

The practical requirement is a demonstration farm on the Peninsula

devoted to nut culture. We should proceed to find out whether nut crops have commercial possibilities. If so what varieties? We want a cultural technique as well as information concerning how and where to obtain our stock.

Is the seedling the thing, or can we secure better results by budding? What is the scientific verdict? I am anxious to find out now that I have become interested in your proposition.

As you see, I am the right kind of a man to have in your meeting because I do not know anything about the subject with which you are concerned. That makes me an ideal listener and I propose to assume my proper role. As President of the Del-Mar-Va Eastern Shore Association I welcome this convention to the Peninsula and I especially desire to extend my congratulations to the representatives of our organization who are in attendance. They should profit by this session, and I sincerely trust they will emerge from it with some very concrete suggestions concerning the steps the association can properly take in helping you further the cause of nut culture.

The President: I have the pleasure of introducing Mr. S. C. Shanahan, who will welcome you in behalf of the city and county.

Mr. Shanahan: Mr. President, ladies and gentlemen: I am taking the place of the President of the Chamber of Commerce, who was unavoidably detained.

A year ago it was with a great deal of pleasure that we learned that our invitation for this convention to meet here this year was accepted. We did not know very much about it, but as the time approached for the convention to convene we realized we were really being honored beyond our deserts. This was still further strengthened by the knowledge which I gained this morning that the Canadian Government has a representative here to ask that this convention meet next year in one of the big cities in that country. We feel honored that Canada should reach its arms away down here.

During your short stay here we want to co-operate with you in every way we can, we want to show you our country, which we think is very beautiful. If there is anything we can do to make your visit pleasant here, do not hesitate to let us know, and again I assure you of our very keen appreciation of your kind attendance here today.

RESPONSE TO THE ADDRESS OF WELCOME

By Zenas H. Ellis, Fair Haven, Vt.

It certainly is a great and signal honor to be invited and welcomed with such courteous and heartfelt words and phrases to this beautiful and productive country of yours, known as the Eastern Shore of Delaware, Maryland and Virginia. Delaware, though small in area, always looms up the first and largest of all in every gathering and procession of the states, as she it was who laid, yes, even herself formed, the corner stone of this our glorious union. "Maryland, My Maryland," is a state ever noted for her impartiality and justice to all and most entitled to pose as the goddess thereof, even with unbandaged eyes. And old Virginia was the mother of our first and best president of all time, past, present and future—George Washington, as Vermont is of the present one, whose good and sterling qualities are known to you all, Calvin Coolidge.

Indeed, taken all together, you are a land of plenty, happiness and contentment, the land of fair women and brave men. The first any one will testify to, to the latter I myself, as you produced the brave sailor Commodore McDonough, who, with every odds against him, preserved inviolate the lake which laves the shore of my native state, Vermont.

Every thing around here betokens abundance and fruitfulness. Your location is such that you enjoy the products of both the temperate zones. You have communication by rail with every part of our country, and by water to all parts of the world.

To no better place have we, nor could we, The Northern Nut Growers, come. You have much to show us in our line of work, and we trust we have something to tell you that will interest and instruct you as a slight recompense for your hospitality, which has always been proverbial.

I will take but a little more of your valuable time. It can be better used by those who come after me on the program, some from your own midst and others miles away, but all noted for their interest, zeal and experience in this, the greatest and most important question and problem of our time, NUT CULTURE.

PRESIDENT'S ADDRESS

In attempting to make an address before this association at this time, I think I had first better assume the attitude of an old doctor I used to read after on the subject of beekeeping. He was looked up to as one of the most scientific and up-to-date beekeepers of his day. When asked a question about some mystery of the bee hive, it was his usual custom to begin his answer by first saying that he did not know and then proceed by giving his experience and observation on the point at issue. That was about as near as anyone could get him to commit himself to knowing a thing. I believe this will be the safest precedent for me to follow when speaking of nut growing while here in this Del-Mar-Va territory.

I believe it was someone, writing under the nom-de-plume of Josh Billings, who onee wrote, "What's the use of knowing so much, when so much you know ain't so?" This would have applied quite well a few years ago to our general knowledge of the propagation and planting of nut trees, but we are gradually getting away from these uncertainties, and hope and feel that we have made some really well founded progress.

Then there is at least one pleasing condition connected with not knowing a thing. It places one in an easy position to change without notice.

There is one item that was developed out of our recent walnut contest about which I want to speak, and that is the Rohwer walnut. As I have been on the ground and have come in personal contact with the person who planted the nut, from which this tree grew, and has owned and cared for it up to the present, I have had a better chance to get more complete information than have the members of our committee who conducted the contest, and have perhaps obtained some items in its history not obtained by them.

When I first heard that an Iowa variety had won second prize, I made up my mind that I should go to see the tree as soon as I could find suitable opportunity, which I arranged to do at the proper time to secure bud sticks for propagation by budding. The Rohwer tree

stands about eighty or eighty-five miles from where I live. We drove over there and found Mr. Rohwer to be a wealthy farmer, owning several hundred acres of that richest, Grundy County soil. The nut from which this walnut tree was grown was selected at random and planted by Mr. Rohwer's son nineteen or twenty years ago. Mr. Rohwer says he thinks the nut was planted nineteen years ago and he is certain that it was not more than twenty years. We drove into the barnyard, right up alongside of the tree. I got out and looked it over and I said, "That tree is a beauty. It is the prettiest and most perfect walnut tree I have ever seen." Forty feet in height and forty feet spread of top. A full, thick head of well placed branches, which gives it a great capacity for the production of nuts. Its largest crop consisted of eight measured bushels of hulled nuts of such size and quality as were the samples sent to our contest, and Mr. Rohwer stated that fully another bushel must have been carried away by numerous individuals and the squirrels.

I don't know why (I have not yet obtained definite information on this point) but the largest crop the Stambaugh has produced is three bushels and the tree is fully double the age of the Rohwer. Now unless there is some reasonable excuse for this shy bearing, such as being crowded by other timber or poor soil conditions, I would be inclined to place the Rohwer far in the lead of the Stambaugh as a commercial proposition.

The Rohwer began bearing when it had obtained a height of about ten feet, or at about the age of four or five years. Considering its present height, it has made an average growth of two feet a year. I believe that, so far as Iowans are concerned, we have struck a bonanza in the Rohwer walnut. It has originated and thrived under our trying northwestern conditions. It originated fully three hundred and fifty miles further north than the Stambaugh and I don't know, but I think we shall place it at the head of the list for northwestern planting.

I regard the Thomas as none too hardy at my place, to say nothing of carrying it further north, and the Stabler I think we shall drop, except to have a few for cross-breeding purposes.

Now right here, before I forget it, I want to ask a question and wish someone, who feels able to do so, would answer it at this time. Is the pollen of the black walnut invisible to the naked eye? Is it so elusive

that we can not capture it and handle it as we do other kinds of pollen in cross-breeding work? I will say that every attempt I have made has failed to obtain visible results. When dealing with filbert pollen one can gather it by the spoonful, if so much is wanted, and with the aid of a tiny camel's hair brush just dose the pistillate blossoms with it, but not so with walnut pollen, I having so far been unable to find a time when it could be visibly captured.

There have been two notable instances in Iowa where a person picked up a walnut at random and planted it and the result was two, new, worth-while varieties. The best one is the Rohwer and the other the Pearl.

I have a plan to cross-breed the choicest varieties of our walnut list, which I have already begun working upon as follows: I have selected an isolated, thrifty, young Thomas walnut tree, which has a well formed top and plenty of room for convenient work. In order to completely control the breeding I shall keep this young tree pruned back to a convenient size and confine it in a glass cloth house during the breeding season. I have already budded into its top the Stambaugh and Rohwer and intend placing two more varieties in this tree, which I have not yet selected, making five varieties including the Thomas. When this top has developed to the blooming age I shall remove the staminate blossoms of all the varieties except one and compel nature to do the cross-breeding for me. I shall attempt to pass this around until I have used each variety as a male parent for the others. I don't know, but I believe the best qualities of our choicest varieties can be combined in some such way as to create something better than we now have and I will have a lot of fun watching the developments. If I am permitted to live long enough I am going to try to work out about the same plan with the shagbark hickories as with the walnut.

There are now and have been for a long time in the past, far more native shagbark hickory trees growing in my county in Iowa than walnuts and from this I take it that the shagbark hickory is better adapted to our conditions than any nut bearing tree that grows. And I don't know, but I believe if the time ever comes that the meats of our choicer varieties of shagbark hickory are offered commercially, they will command a higher price than any other nut meat that can be produced in the North, or for that matter, anywhere else.

However, it is a very hard proposition how best to go about it to establish a shagbark hickory orchard. I should say, buy propagated trees if you can get them, if not, plant nuts where you want the future tree, and then top work the resulting seedlings to the choice varieties. I don't know but I think I have just experience enough to warrant me in saying that by this latter plan I can beat any other plan to the production of shagbark hickory nuts. The most discouraging feature in establishing a hickory orchard is the long period of time required to bring it up to profitable bearing. I have some more or less accurate data on this particular point. At home we have a shagbark hickory tree which is just about forty-eight years old, which was produced by planting a nut where the tree stands and has not since been disturbed. The first nuts produced on this tree were in its eighth year, since which time there has been a gradual increase in the volume of its crop until last year it produced five pecks of clean, cured nuts at the rate of fifty pounds per bushel and quite a few more were taken by the kids and squirrels before the cured crop was weighed up. At the low price of ten cents per pound, this tree last year produced more money than the real value of the land which it occupies. What if it does take fifty years to develop such a tree? I regard it as yet only an infant just beginning a useful career, and standing in good soil with favorable surroundings, barring accidents, it is certainly good for several hundred years and perhaps a thousand, even a more enduring monument to its planter's memory than a slab of marble.

Young people are the ones who should be planting these long-lived trees. A young man ought to live long enough to realize much benefit from such a planting.

The shagbark hickory and black walnut are the nuts I like best and I am going to give the most of my attention to. They will also be more successful than any others under our Iowa conditions. There are other more or less desirable nuts which we can grow, which I will notice very briefly. The butternut is a thrifty, hardy, and fruitful tree, of which we have four outstanding varieties in Iowa, namely, Buckley, Sherwood, Utterback, and Helmick hybrid. The latter a hybrid of Sieboldi and the native butternut. Of pecans, shellbark hickories, and hiccans we have quite a list that succeed well in the southeastern part of our state but I am beginning to fear they will be of little use in my part of Iowa (Linn County). Chestnuts do well if

we select the hardier varieties. Filberts, I have tried out some twenty odd varieties and have discarded the most of them. The American hazel is all right to plant in my part of Iowa and is the only nut bearing a full crop this season. A variety called Winkler we are using as a mother plant and compelling it to use Italian Red filbert pollen to fertilize its pistillate blossoms. We hope a hardy hybrid will result with some better qualities than the native hazel.

I don't know but I have already drawn this out too long in view of the fact that I can only speak of Iowa conditions and Iowa varieties.

There is one thing for the future benefit of the members of this Association that perhaps we should begin to consider and that is co-operative advertising, cracking, and selling of the products of our orchards.

The past, present, and future of this association has been so well covered by my recent predecessors in this office that I think it useless to attempt to re-hash anything in this line at this time.

In closing I wish to kindly thank all those who contributed to the arrangement of the splendid program we have before us. Your advice was good, timely, and thoroughly appreciated.

The President: Is the pollen of the black walnut invisible to the naked eye? Is it so elusive?

Dr. Morris: It is abundant if the catkins are ripe. I presume from what you said that you were dealing with catkins that were not fully ripened. Possibly you have a variety that does not make pollen.

The President: The Thomas is what I try to get it from.

Dr. Morris: That pollinates abundantly.

THE SECRETARY'S REPORT

Your secretary has had but little experience in budding trees, none in grafting or propagating new varieties.

His experience as a secretary was never greater than that which falls upon the shoulders of some such officer in a local club or social organization.

The first thing done, naturally, was to issue a call for help. Letters were written to each vice-president asking for a report of the situation in his or her jurisdiction concerning the interest in nut growing plants, as far as his observation extended. Suggestions for future action to extend to the public a knowledge of the value of nut trees for food and shade, and also means of bettering the nut industry were requested.

Not many responses were made. Miss M. V. Landman of Cranbury, New Jersey, sent a very full report with many ideas of value.

The Department of Agriculture of North Carolina stated it was not interested so much in plans for producing nuts as it was in a plan for selling them.

These letters were turned over to the members of the program committee for development as might seem best to them.

Having had some years back, a little experience in newspaper work, your secretary decided he could best serve this organization by letting the general public know of its existence.

The Illinois Central Railroad Co. at Decatur, Illinois, has quite a park adjoining its station grounds. A suggestion was made to the company that chestnut trees be planted there, both for the beauty of the trees and as proof to the residents of Decatur, and to the tourist passing by, that chestnuts would grow in Illinois, and also were a valuable addition to the landscape.

A most cordial response was made by Mr. L. A. Downs, President of the Illinois Central System, and four trees were ordered from Miss Amelia Riehl of Godfrey, Illinois. When the ground was measured for planting it was found there was room for five trees. Miss

Riehl manifested her interest in the attempt by donating the fifth tree.

The trees were planted in November, 1926. All are living and growing vigorously; one has blooms on three out of four branches.

The next attempt at publicity was prompted by an invitation to attend an apple show. Why not have a nut show? An appeal was made to W. G. Bixby, of Baldwin, New York; J. F. Jones, Lancaster, Pa.; J. F. Wilkinson of Rockport, Indiana; Amelia Riehl of Godfrey, Illinois; O. H. Casper of Anna, Illinois; Whitford Brothers of Farina, Illinois, and Conrad Vollertsen of Rochester, New York. Each responded at once and as a result, in the Public Library of Decatur, Illinois, on a table near the main entrance were displayed nine varieties of chestnuts, two pecans, two hiccans, five black walnuts, three shellbark and three shagbark hickories, chinkapins, butternuts, Japanese walnuts, Japanese heartnuts, hazelnuts and filberts, all grown in Illinois. With those sent from other states forty-three specimen plates of nuts were exhibited.

The next adventure in publicity was a request to the City Council of the Federation of Parent-Teachers Associations to plant nut trees on Arbor Day, on the grounds of the public schools with appropriate ceremonies. The oak is the emblem of the Council, and it decided to plant a red oak as its contribution to Arbor Day, but recommended planting nut trees for the pleasure of the children upon the school grounds. This was done at six of the schools.

Arbor and Bird Days are fixed for some time in April or October by proclamation by the governor. An appeal was made to Governor Small to call attention to nut trees for Arbor Day, especially when so many kinds are native of Illinois.

His response was pleasing and prompt. He designated April 8th as Arbor Day, and October 7th as Bird Day. In his proclamation he inserted this paragraph:

"I would particularly direct attention to the advantage of planting trees which produce edible nuts. Our soil in many places is well adapted to the production of all the varieties common to the temperate zone and I believe that such trees at maturity will prove not only sources of pleasure but also of profit to their owners."

This same request was also made of the governors of several other states. Most of the executives referred it to the horticultural departments and what was done never was reported to this office.

The letter to the Governor of Kentucky was referred to the State Forester, Mr. Fred B. Merrill of Frankfort. His department was not only interested in the idea but wanted to know where the nuts might be sold, as large quantities of black walnuts grow in that state and are wasted, as no market facilities for the producers have been developed. Mr. Merrill became a member of this association.

About this time it became apparent that somebody was advertising the details of the contest for the best black walnut. As soon as the details came to the secretary he forwarded copies of the rules of the contest to the secretary of the State Board of Horticulture and he very kindly published the same in the monthly bulletin of that department. This bulletin goes to all parts of Illinois and to the office of similar boards in other states.

The rules of the contest were sent to the presidents of several railroads which serve territory in which walnut trees grow. The Illinois Central Railroad and the Wabash Railway each published these in their magazines. Copies of these go to their agents, shippers, stockholders and the press. This aided the publicity campaign.

Fifteen hundred circulars were distributed telling the plans of this association and what its ambitions were, also giving reasons why the reader should join and support the organization.

The result of this publicity was a flood of letters asking for the names of nurserymen who grew nut trees. Others wanted to know how to grow them, when to plant them, how to bud them, what was a fair price for nut-meats, etc., etc. One lady wanted to know if 35c per pound was a fair price. Another said she was getting tired of cracking walnuts with a hammer and a brick and asked information about nut cracking machinery.

Those who think no interest is being taken in nut trees nor in the activities of this association have been misinformed.

Among the dozens of letters asking for instruction on various points of the nut industry was a letter from Portland, Oregon, stating that

the writer was about to plant five hundred acres to black walnuts and wanted to know where he could purchase them. Another letter stated that the writer and his brother contemplated planting seventy-five thousand (75,000) black walnut trees on twenty-five hundred (2500) acres in Oklahoma and asked for information.

An attorney at Mattoon, Illinois, wished information because he and some friends were about to plant forty acres to nut trees.

A young soldier of Decatur, who served with honor over seas, said his mother owned fourteen acres in Southern Illinois, and wanted to know if nut trees would grow there, etc.

A lady living in Oregon wrote that she was about to move to Southern Illinois, where she owned eighty acres of land and intended to make her home. She wanted to know all about nut trees, planting varieties, etc., and whether they would grow in the county she named.

Questions like these need careful consideration for a little bad advice might easily cause a serious loss. Fortunately, the land of the young soldier and of the lady from Oregon in Illinois is surrounded by walnut and pecan groves of native trees. Near them are nurserymen of character and skill, members of this association, who are ready to help and instruct them. Your secretary advised each of these people to join this association, subscribe for the American Nut Journal, buy the bulletins on nut culture advertised in the Journal, especially the book on Nut Culture by Dr. Morris, write to Washington for Farmer's bulletins Nos. 1392 and 1501 on the black walnut, and also consult C. A. Reed, Associate Pomologist, Nut Culture Investigations, Bureau of Plant Industry, Washington, D. C.

The next event was the secretary's appearance as a lecturer at the Illinois State Fair, August 26th. The officials of the Department of Agriculture are in hearty sympathy with this association and its ambitions. Handsome premiums were offered for exhibits of nuts grown in Illinois. This premium list was re-instated this year at the suggestion of this association, and an unexpected display was made. It both surprised and pleased the officials of the fair.

Through the courtesy of Mr. C. A. Reed, fifty-one lantern slides were sent to your secretary. There were very fine pictures of nut trees which aroused much interest among those who saw them.

In this connection, your secretary is pleased to call attention to the prominence of Illinois in the contest for the best black walnut. The first prize and several others went to people living in Illinois.

Three different events in your secretary's endeavors to carry on a campaign of information and education, have magnified two needs which should receive attention.

The first is an increase in the active membership in the association. If the various agricultural schools could be persuaded to interest young people so that they would take the student membership when the school is teaching nut culture, this would help. If the Farm Bureau members would encourage the members of the 4-H Clubs to become members of this association and make planting of nut trees about the home grounds, one of the objects of the various clubs, the farmsteads would be more beautiful and the home lives of the members have a greater attraction.

If the various park boards of our cities would plant a nut arboretum of those nut bearing plants native to the state in which the park is located, the enthusiasm of youth could be easily enlisted to protect the trees. When children are drafted into the enterprise, it will not be long before the sympathy of the parents becomes aroused and they too will gladly help the children in their efforts.

This, of course, is a large proposition. It requires publicity and be adopted on the first presentation, but as a plan of improvement. The details should be carefully worked out and so presented as to convert the hearers to the value of the enterprise advocated.

The second need of this association is a plan for marketing the nut products. Largely because of the publicity given by the nut contest, which will be reported by Dr. William C. Deming and Mr. Willard G. Bixby, the secretary has received letters from citizens of Iowa, Kansas, Illinois, Carolina and Virginia. Some asked, "Where can we sell the nut meats we have?" Others ask, "Will you please tell us where we can buy walnut meats?" One man wrote about a year ago, "I want seven car loads of black walnuts. Can you tell me where I can get them?"

If ten men have nuts or nut products for sale, they can appoint one

member of the group to advertise that fact at less expense than if all ten men advertised. If all their product is brought to one place, packed, shipped and sold, it would cost less than if each of the ten conducted the business. That, on a small scale, is co-operative marketing.

Walnut kernels last year, as disclosed by correspondence, were sold all the way from 30c to $1.00 per pound. Chestnuts were sold in Illinois, all the way from 15c to 40c per pound. Something is wrong with the market methods when such variations in price exist for goods of uniform quality.

While at the Illinois State Fair in August, a gentleman asked where he could sell black walnuts. He said, "The timber of Pike County is full of walnut trees. It would be easy to get the Boy Scouts to bring them in if they only knew where they could sell them." He said, "I recently moved to my new home. We had more than a bushel of black walnuts on hand. We did not care to take them with us, so we put them on the trash pile and burned them."

Because of the various incidents mentioned, it seems to me this organization should compile a list of producers and a list of buyers so as to make it worth while to plant superior kinds of nut trees for the future betterment of quality, but in the meantime to help sell such nuts as are available now.

The foregoing different events detail the efforts made by the secretary to extend a knowledge of the aspirations of the Northern Nut Growers' Association to educate the public concerning the value of nut bearing plants for food and shade, and if possible, to stop an economic waste.

When the public realizes that we import nuts to the value of about one million dollars per week, most of which may be produced in this country, they will know such procedure is a waste and nothing else. It is time that the agricultural schools follow the advice of the Bureau of Plant Industry of the U. S. Department of Agriculture. They should find out what nut bearing plants are suitable for their several states, then through their school journals and publications spread the information. Through the Farm Bureaus the results of their studies and experiments may be brought home to the farms, and thousands of acres made a source of revenue which are now idle and unproductive.

If your secretary has done any one thing commendable, it is due to the unfailing good will and co-operation at all times, and under all circumstances, manifested toward him by Dr. William C. Deming, C. A. Reed, Lewis Edwin Theiss, W. G. Bixby, Ralph Olcott, Dr. Robert T. Morris, A. S. Colby, Thomas P. Littlepage, and Dr. J. Russell Smith besides those already mentioned, and many others.

The kindness, sympathy and appreciation of efforts made, shown to your secretary, creates a glow of gratitude in his heart that words can neither picture nor express.

Here is one letter I would like to read to the people who think that nut growing cannot be carried on and that they ought not to go into it because it is so discouraging and such hard work:

Normandy, Tenn., March 19, 1927

Your letter of last Nov. 6th reached me, sick, helpless, diabetes victim, leg off. I am now some better and write you. My heart is still for pecans, especially, and fruited some nice ones last October. A boy was here a few days ago, all enthusiasm, for he had seen the products. The Major is a favorite. Have the Luckado, which should bear this season of Major type. Am charmed with its thrift. Also Marquardt, which I hope to fruit also. Have it grafted on large pecan. I successfully did all kinds of propagating, pecan on hickory, etc. The latter on shellbark, so far is doing well.

Have you minutes of St. Louis meeting? And of last Fall? Price them. I keep pecans at head of bed, and show them to inquirers. They can scarcely believe that such fine paper shelled nuts can be grown here. From my work as a nucleus, a great planting will be made. I see that coming. Thanks for information as to minutes. Am seated on bed with machine on my Morris.

J. W. Waite

I will read the report of Mr. John E. Cannaday of Charleston, West Virginia.

Although I have been observing walnuts, as well as the European varieties of filberts, for more than ten years and have planted a number of them, I have yet to see any promising indication of a crop in this particular section which, with the adjacent hills, varies from 600 to 1800 feet above sea-level. I have a few northern belt pecan trees that have grown rapidly. Some of them have been out for eight years. This year one pecan set on one of them.

Hickories, while very numerous throughout this section, seem, in the case of the shell bark, to bear but sparingly. In the higher altitudes, up between two and three thousand feet above sea-level, they apparently do a great deal better. Pignut types bear profusely.

The chestnut blight is going strong throughout this section, the infestation being now over ninety per cent. This will hit the wild chestnut business a body blow in the Blue Ridge and Alleghany Mountains section. I do not doubt but what in the course of time our chestnut trees will develop a relative immunity or higher resistance to the blight, just as happened in China and Japan, where trees are infested with blight but the disease makes but little headway and the tree goes on about its business. It has been observed, time and again, that where the plant or organism has been brought in contact with the disease, the plant or animal ultimately becomes able to defend itself. In spite of the blight, one sees many large healthy trees that have been but very slightly affected.

I believe it is of the utmost importance that the planting of both Chinese and Japanese chestnut trees be encouraged. My young trees of these varieties, about six years old from the nursery, have as yet shown no signs of blight.

In this part of the country, which usually includes southern Ohio, the most successful nut bearing trees, will, I believe, always include the black walnut, butternut and Japanese walnut. They all grow rapidly, bearing early and regularly, and are good shade trees as well.

I do not know of a more stately shaped tree than the pecan, but as to whether it will be profitable, commercially, in this section, as a nut bearer, remains to be seen.

Countries somewhat adjacent to large bodies of water are much less troubled by late spring frosts than other sections, but land districts such as ours are often severely dealt with by late spring frosts.

On a recent trip through Virginia I noticed, at Culpepper, a large and flourishing English walnut tree, and was told that it bore a considerable quantity of nuts nearly every year. For my own home location I believe that, with the exception of Japanese walnuts, we will have to stick to native things.

Beech nuts are of course plentiful, in fact most years we have them in great profusion. While very small they are most delicious and are much sought after by hogs, turkeys and by much of the wild life of the woods. The time may come when they will be gathered, shelled, cleaned and marketed as are pinon nuts in the West. Superior large varieties may also be located.

Acorns of the usual sorts, red oak, chestnut oak and white oak are always at hand. The American Indians leached out the bitter principle and made an edible substitute for mush, or grits, from acorns. With the increasing population, and diminishing food supply, all possible sources of nutriment will of necessity have to be considered in the future.

TREASURER'S REPORT

From Sept. 1st, 1926 to Aug. 31st, 1927, both dates inclusive

H. J. Hilliard, Treasurer, Sound View, Conn.

RECEIPTS

From previous year	$ 365.28
" Advertisements	59.70
" Contributions	381.55
" Interest	.57
" Sales of Literature	19.16
" Membership Plan No. 6	115.50
" " " No. 11	231.00
Balance in Nut Prize Fund	16.46
	$1189.22
Expenditures	1016.68
Balance at close of the year	$ 172.54
Said balance consists of	
Deposit in Middletown National Bank, Middletown, Ct.	$ 156.47
" " Litchfield Savings Society, Litchfield, Ct.	15.20
Cash on hand	.87
	$ 172.54

DETAIL OF EXPENSES

Envelopes and Printing	$ 19.66
Letterheads and Printing	21.50
Bill Heads	.10
Postage	57.76
Postal Cards	1.00
Insurance and Registry Fees	1.18
Express	2.56
Cartage	.44
Telephoning, Telegraphing, Etc	14.84
Stenographic Work, Etc. Wilma T. Green	12.80
Time, Membership List. Violet Bourne	3.75
100 Post Cards and Multigraphing. Violet Bourne	2.41
160 Letters and Multigraphing. Violet Bourne	2.95
Stenographic Work, Etc. Wilma T. Green	12.80
Clerical Work. Florence R. Sloane	2.75
500 Copies 16th Annual Report, 128 Pages and Cover at $2.00	264.00
Mailing 16th Annual Report	2.00
Reporting 17th Annual Convention. Mrs. S. K. Oswalt	50.00
Hotel Expenses 17th Annual Convention. Mrs. S. K. Oswalt	12.50
Hotel Expenses 17th Annual Convention. Secretary	9.00
Meals, 17th Annual Convention. Secretary	14.45
Railroad and Pullman Tickets. Secretary	65.25
Painting Sign for Hotel Entrance, 17th Annual Convention	3.00
Complimentary tickets, 17th Annual Convention	4.50
500 Copies 17th Annual Report. 132 Pages and Cover at $2.00	272.00
Taxi and street car fare	1.50
Tickets	2.25
Mimeographing, Addressing Envelopes, Etc	18.59
Folder. Walnut Bulletin	58.59
2 Filing Boxes	1.20
Rubber Stamp for Secretary	.80
1500 Reprints of Association Circular	7.00
	$1016.68

NUT PRIZE FUND

Balance from Previous Year		$ 137.20
Contributions		275.00
Sales of Nuts		24.70
		$ 436.90
Expenses	$276.44	
Prizes	144.00	420.44
Balance		$ 16.46

EDIBLE ACORNS AS FOOD FOR MAN

LIVESTOCK AND FOWLS

By Robert T. Morris, New York City

Most of us have had a sort of general knowledge about acorns without thought of their potential in the way of future food supply. It was only when my interest happened to become engaged in a special way that the subject began to expand rapidly and I soon found that a whole lifetime could be devoted to this one subject. The situation was very much like that in which the German professor found himself when he suddenly realized that he had wasted a lifetime on verbs when he should have given all effort to concentration upon the dative case.

The subject of acorns for food supply has remained in the background for the reason that farmers are now producing so much more food than we can use that they do not know what to do with the oversupply. Farmers are trying all sorts of quack methods for relief in order to escape from a situation which they have brought upon themselves. The next move, it seems to me, will not be so much in the way of finding new food supplies but rather the cheapening of those which we already have. Cheapening of the ones which we already have will occur when the expense of labor and tillage of the soil for the raising of annual crops will diminish and we then turn to subsoil crops which avoid the expense of tillage and labor.

Acorns already belong to tree crops which are utilized largely as food for livestock and fowls and in many parts of the world they constitute a basic food supply for man. It is only recently that the screw point of my interest in acorns became engaged in the thread of the subject.

My friend, Dr. B. L. McClellan of Xenia, Ohio, sent on some acorns from Yellow Springs in his state. He said that they were not only highly prized by pigs and fowls but that he had eaten them roasted and boiled and found them to be particularly good. I went out to Yellow Springs and looked over the oak tree. It was a narrow leaved chestnut oak (Quercus Muehlenbergii). Other trees of the species

grew in the vicinity. There were few chestnuts in that vicinity and the fruit from this narrow leaved oak took the place of chestnuts for pigs, fowls and boys.

I began to look into the question more deeply. Some of us are already familiar with the fattening of cattle, hogs and fowls on acorn mast. Some of us older members remember perhaps to have seen a hundred thousand wild pigeons sweep into an oak hillside, these to be followed by another hundred thousand and another. We hardly realized the enormous number of tons of acorns that were being picked up by the wild pigeons. Oak trees are adapted to a very wide variety of soils, in fact, I do not know that we have any soils that bear trees of any kind which will not grow some of the more than fifty species of oak trees and shrubs which are indigenous to this country. Many kinds can be raised upon the prairies where there are now no trees. The prairies were treeless in the past because of fires rather than because the soil was not adapted to hardwood growth.

We know that even from seedling oak trees the crop of acorns exceeds in food value the crop of corn which may be raised by tillage upon good land. When we come to making selection, hybridization and grafting, the history with the oak trees will presumably be almost precisely that which has applied to other fruit and nut trees. Furthermore, some of the trees will produce heavy crops of mast upon rocky and upon soil that is too poor to grow crops of annual plants with tillage.

Cattle, horses and fowls will eat acorns that are distasteful to man because of tannin, berberine and other extractives, but there are a number of species of oaks bearing so-called sweet acorns which are all ready for roasting and boiling or for being made into flour for man's uses. Many of the species of oaks which bear bitter acorns are already used by man after artificial preparation which removes the elements interfering with the good taste and acorns of this sort as well as sweet acorns are made into cakes and porridge.

A well flavored oil is extracted from several species of acorns and in others the acorn cups alone produce such a high percentage of tannin and of coloring matter that the cups pay for the cost of gathering the harvest of nuts which have their own special value.

In the absence of extended study of acorns for food for man and his farm stock, I had thought best at this meeting to start the ball rolling by writing a number of authorities and obtaining reports which might be assembled. I have learned, however, that Dr. J. Russell Smith has very complete and important notes relating to acorns, in manuscript form. These will appear in a new book entitled Tree Crops, to be published shortly.

Mr. H. R. Mosnat of Chicago, Illinois, has turned over to me a letter from Mr. A. B. Hastings, Acting Assistant Forester, Forest Service, United States Department of Agriculture, who quotes from a memorandum of Mr. W. A. Dayton, Associate Plant Ecologist:

"In general it is probably safe to say that the acorns of the White Oak group are sweeter than those of the Black Oak group.

"The acorns of the Swamp Chestnut Oak, locally known as Basket Oak (Quercus prinus—Q. michauxii) are sweet and edible. Certain individual trees of the Chinquapin Oak, popularly known as Chestnut Oak (Quercus Muehlenbergii—Q. acuminata) bear edible acorns. Probably other trees in this group of eastern oaks also, at least occasionally, have acorns that are suited to human consumption. I have myself, as an experiment, roasted the acorns of White Oak (Q. alba) and have found them not unpalatable.

"In the Southwest, the acorns of the Mexican Blue Oak (Q. oblongifolia) form an important article of diet among certain Indians. In California and Oregon a number of the white-oak-group oaks are prized by various Indian tribes for the acorns, whereof they make bread, soup, etc. Among these are the Valley White Oak (Q. lobata), Oregon White Oak, Oregon Oak, or Gerry Oak (Q. Gerryana) and Blue, Oregon, or Douglas Oak (Q. Douglasii).

"The Holly Oak, or Holm Oak of southern Europe (Q. ilex) is famous, especially in var. rotundifolia and other forms, for its edible acorns which are prizel by Italians, Spaniards, etc. The acorns of some of the forms of this species are said to turn sweet in storage. Quercus ballota of Morocco bears large edible oily acorns that form an article of trade with Spain.

"In Japan the nuts of the Blue Japanese oak (Quercus glauca) are

an important article of food, being extensively cooked and eaten. Two of the tanbark oak group (Lithocarpus Quercus), at least, have edible acorns, viz.: Lithocarpus edulis (Quercus edulis) of Japan and Lithocarpus cornea (Quercus cornea) of China. In England it is said that certain individual trees of Quercus sessiliflora are noted for the sweetness of their acorns."

Mr. H. Ness, horticulturist of the Texas State Experiment Station published an article entitled "Hybrids of the Live Oak and Overcup Oak" in the Journal of Heredity, Vol. IX, No. 6, Washington, D. C., October, 1918 and has published subsequent notes making the comment that he has become impressed with the ease with which fertile hybrids may arise between species of oaks, even though their relationship be apparently quite distinct. A number of second generation trees from the hybrids of Mr. Ness have been obtained and the notes should be added to any bibliography now being assembled bearing on the subject of acorns. Mr. Ness says that, "Because of the ease with which the hybridization of the live oak can be effected, the high fertility of its hybrids and other virtues already mentioned, to which, very likely, will be added improvement of the timber, there can be no doubt but that the breeding of new forms of oaks as here indicated has great economic and aesthetic possibilities."

In response to my letter to Dr. V. K. Chestnut, Associate Chemist of The Food, Drug and Insecticide Administration at Washington, Dr. Chestnut replied that I will find notes of value for my purpose in his official report entitled "Plants Used by the Indians of Mendocino Co. Cal., published in Contributions to the National Herbarium V. 7, pages 333-344, 1902.

Mr. Ernest H. Wilson, Keeper of the Arnold Arboretum at Jamaica Plain, Mass., sends me the following notes from "Sturtevant's Notes on Edible Plants." (pp. 479-82).

Quercus aegilops Linn. Cupuliferae. Camata or Camatina Oak. Valonia Oak.

South Europe and Syria. The cups, known as valonia, are used for tanning and dyeing as are the unripe acorns called camata or camatina. The ripe acorns are eaten raw or boiled.

Q. agrifolia Nee. California Field Oak.

The acorns are eaten by the Indians.

Q. alba Linn. White Oak.

Northeast America. The dried acorns are macerated in water for food by the natives on the Roanoke. Acorns were dried and boiled for food by the Narragansetts. Oak acorns were mixed with their pottage by the Indians of Massachusetts. Baskets full of parched acorns, hid in the ground, were discovered by the Pilgrims December 7, 1620. White oak acorns were boiled for "oyl" by the natives of New England. The fruit of some trees is quite pleasant to the taste, especially when roasted.

Q. coccifera Linn. Kermes Oak.

Mediterranean region. The acorns were used as food by the ancients.

Q. cornea Lour.

China. The acorns are used for food. Loudon says the acorns are ground into a paste in China, which, mixed with the flour of corn, is made into cakes.

Q. Emoryi Torr.

Western North America. This tree furnishes acorns, which are used by the Indians of the West as a food.

Q. Garryana Dougl. Western Oak.

Western North America. The acorns furnish the Indians with food and are stored by them for future use.

Q. ilex Linn. including Q. ballota. Ballota, Bellot, or Belote Oak. Holly Oak.

Mediterranean region and the Orient. From varieties of this tree, says Mueller, are obtained the sweet and nourishing ballota and chestnut acorns. Figuier says this species is common in the south of France, and that the acorns are sweet and eatable. Brandis says the acorns form an important article of food in Spain and Algeria. The acorns are eaten in Barbary, Spain and Portugal under the name of belote. In Arabia, also, they are eaten cooked, and an oil is extracted from them. In Palestine, they are sold in all the bazaars.

Q. lobata Nee. California White Oak.

California. The acorns form a large proportion of the winter food of the Indians of North California. The acorns, from their abundance and edible nature, form a very important part of the subsistence of the Digger Indians and are collected and stored for winter use.

Q. Michauxii Nutt. Q. Prinus. Basket Oak. Cow Oak.

North America. The large, sweet, edible acorns are eagerly devoured by cattle and other animals.

Q. oblongifolia Torr. Evergreen Oak. Live Oak.

California and New Mexico. This species furnishes the Indians of the West with acorns for food use.

Q. persica Jaub. et Spach. Manna Oak.

Persia. The acorns are eaten in southern Europe and, in southern Persia, afforded material for bread. The leaves also furnish a manna. In olden times, as we read in Homer and Hesiod, this was the common food of the Arcadians. There is, however, much reason to suppose that chestnuts, which were named in the times of Theophrastus and Dioscorides "Jupiter acorns" and "Sardian acorns," are often alluded to when we read of people having lived on acorns in Europe; and, in Africa, dates are signified, because they were likewise called by Herodotus and Dioscorides acorns and palm-acorns. Batholin says that in Norway acorns are used to furnish a bread. During the famine in France in 1709, acorns were resorted to for sustenance. In China, the fruits of several species of oak are used as food for man, and a kind of curd is sometimes made from the ground meal. Oak bark is pounded by the Digger Indians of California and used as food in times of famine.

Q. phellos Linn. Willow Oak.

Eastern States of North America. The acorns are edible.

Q. prinus Linn. Q. montana. Chestnut Oak.

Northeastern America. The fruit is sweet and abundant.

Q. robur Linn. Black Oak. Truffle Oak.

Europe and western Asia. Varieties are mentioned by Tenore as bearing edible acorns. This species yields a manna-like exudation in Kurdistan. Hanbury says a saccharine substance called diabekei manna, is found upon the leaves of the dwarf oaks about Smyrna, from which it is collected by the peasants, who use it instead of butter in cooking their food. The taste is saccharine and agreeable.

Q. undulata Torr. Rocky Mountain Scrub Oak.

California. The acorns are sweet and edible.

Q. virginiana Mill. Live Oak.

Eastern North America. Eastern Indians consumed large quantities of the acorns and also obtained from them a sweet oil much used in cookery.

Mr. H. C. Skeels, Associate Botanist, of the Bureau of Plant In-

dustry, Washington, sends me at Dr. Galloway's request, the enclosed notes on edible acorns which have been introduced in the group of foreign seed and plant introductions.

Quercus ilex L.

From Ronda, Spain. Seeds presented by Mrs. N. Low, at the request of Dr. D. Fairchild.

The Ballota is only a seedling variation of Quercus Ilex, which in the Balearic Islands, is so much appreciated because of its large, sweet acorns that it is grafted on the bitter-acorn-bearing form as a stock. In southern Spain I was assured that acorns from a sweet Ballota tree would produce trees with sweet acorns. (Fairchild).

Quercus junghuhni Miquel.

From Bangkok, Siam. Seeds collected by J. F. Rock.

No. 88, Chiengmai, Siam. A tree 80 to 90 feet high, fine wood, and said to be a quick grower. The acorns are very small like the chinquapin, with the shape of the chestnut. Real sweet, the best of all the edible acorns. (Rock)

Quercus lindleyana Wall.

From Siam. Seeds collected by J. F. Rock.

No. 77a, from Bangkok, Siam. Grows in dry piny, grassy regions. Might thrive on the pine lands of Florida.

Deciduous. These acorns are not quite so sweet as those of the other oaks. (Rock)

Quercus polystachya Wall.

From Siam. Seeds collected by J. F. Rock.

No. 78, from Bangkok, Siam. A medium sized tree, bearing small edible acorns in densely packed spikes, sometimes over a hundred nuts on one spike. The tree grows in quartz sand, loam soil, hot regions; elevation about 2500 feet. (Rock)

Quercus sootepensis Craib.

From Siam. Seeds collected by J. F. Rock.

No. 82, from Bangkok, Siam. Valuable oaks which grow on dry, shady or gravelly slopes, at altitudes of 2,400 to 5,000 feet, and I should think that they would thrive in California and also in Florida. The acorns are very sweet and are eaten roasted. I have eaten many of them myself and they are rather good. The trees are prolific bearers, and seeds are plentiful just now. (Rock)

Quercus thomsoni Miquel.

From Siam. Seeds collected by J. F. Rock.

No. 89, from Bangkok, Siam. Valuable oaks which grow on dry, shady or gravelly slopes, at altitudes of 2,400 to 5000 feet, and I should think that they would thrive in California and also in Florida. The acorns are very sweet and are eaten roasted. I have eaten many of them myself and they are rather good. The trees are prolific barers, and seeds are plentiful just now. The acorns are flat, thin shelled and sweet. (Rock)

Quercus truncata King.

From Siam. Seeds collected by J. F. Rock.

No. 75, from Bangkok, Siam. This oak grows in quartz-sand soil in deciduous forests. It is one of the most prolific bearers of the region. The acorns are about an inch long and not quite half an inch thick, with thick shells. They are borne in dense spikes and sometimes grow together in the shape of a fan. The whole spikes fall and cover the ground. Natives roast and eat them. (Rock)

Lithocarpus cornea (Lour.) Rehder.

From Hongkong, China. Seeds purchased from W. J. Tutcher, Botanical and Forestry Department.

An oak-like tree with oblong, sharp-pointed evergreen leaves 2 to 4 inches long, which are smooth and green on the under side interesting particularly as bearing acorns as hardshelled as the nuts of the American hickory and which contains a kernel almost as sweet as the sweetest Spanish chestnut. Said to be a very showy ornamental as grown on the island of Hongkong. (Fairchild)

Prof. W. L. Jepson of Berkeley, California, in answer to my question sent the following notes under date of September 21, 1927:

"As to the use of acorns for food by the native tribes, it is to be said that all species were used. In general the White Oaks, Quercus douglasii, Quercus garryana, and Quercus lobata, were most frequently employed, but the more astringent Black Oaks, Quercus agrifolia, Quercus kelloggii, and Quercus wislizenii, furnished ample crops, the ground meal being subject to leaching before baking into a sort of loaf.

"This same observation applies also to the very abundant Lithocarpus densiflora, or Tan Oak, of the Redwood belt. The acorns of this species were extensively used by the Indians and even within comparatively recent years one has been able to see Indian women leaching

flour made from Tan Oak acorns, the leaching being done in the sandy beds of northern rivers.

"There is undoubtedly very great variation in the quality and yield of the various individual trees of one species, even in a given locality. Trees notable for their yield and especially for the quality of their acorns, were the special property, in aboriginal days, of a particular family or small tribe. This fact of variation is true as well of the Black Oaks; for example, the Coast Live Oak, Quercus agrifolia, varies so remarkably in the edibility of the acorns as borne by these trees that the yield of certain trees is estimated by white men as a substitute for chestnuts. There are gardeners in the great Del Monte grounds at Monterey who gather the acorns of a certain Coast Live Oak tree which stands in that area and eat them as they go about their work just as they might chestnuts.

"Some further material upon this matter can be obtained from my Silva of California, which is in the New York Library and in the library of the New York Botanical gardens. There is also an article entitled "Food Products of the Native Trees" on page 164 of my small manual entitled "The Trees of California," Edition 2. Doubtless this can also be consulted at the New York Botanical Garden."

PRIMITIVE MANUFACTURE AND USE OF ACORN MEAL

By V. K. Chestnut, U. S. Department of Agriculture

I can corroborate very well what Dr. Morris has said. I am a chemist, but do not belong to the Chemical Foundation. I have, however, sat at the foot of the Indian and have learned a great deal from him.

I had an opportunity in 1892 to go up to an Indian reservation in northern California and make a study of their food habits. My object

at that time was to do some vacation work in making anthropological measurements of Indians for the benefit of the Chicago World's Fair Exposition. At that time I made some interesting notes on Indian foodstuffs, and among them none were more important than the intensely interesting methods developed by these poor, despised, Digger Indians in preparing acorn meal and in making acorn bread. A few years later I had another opportunity to go back to that reservation and make a more extended study of these uses.

The buckeye, which as you know, is poisonous, is a nut eaten by these Indians. They have learned by long experience how to get the poison out of it. They simply roast the nuts, slice them, put them into a bag and allow them to lie in running water over night. The water extracts all of the poisonous saponin and leaves most of the nutriment behind.

There are a great many species of oak in California. The acorns from all of these species are more or less bitter. They are very bitter as compared to the sweet acorns eaten in very large quantity in Italy. The Italians do not grind their acorns into a meal, but eat them directly without any preparation at all. Large morsels are swallowed and pass undigested through the body. The Indians of California have, however, followed the method employed everywhere by scientific stock feeders. They have learned to grind these nuts very fine before eating them. They go out when the acorns are ripe with large baskets held on the head, and with hands throw the acorns into the baskets which are thus very quickly filled. One family will often gather 8 to 10 bushels a year. They are dried in the hot sunshine, split in halves and stored in the dry condition for future use. Thus prepared there is no danger whatever of the nuts getting moldy.

The grinding of these dried acorns into meal, the sifting, the elimination of the bitter principles and the transformation of the meal into mush and bread are all exceedingly interesting processes which must have been slowly evolved during hundreds of years by the older Indian women of the tribes. The methods are very much alike in all the tribes and are picturesquely portrayed in some of the pictures which I will show you this afternoon. The prominent figure in these pictures is an old Yuki squaw. I went to her tepee to take her picture, but found her apparently almost dead. I handed her a quarter

and started to leave, but to my great surprise she got up and was soon posing for the photograph. Her only tools were a flat stone, a bottomless bowl-shaped basket, which sat upon the rock, a flat circular piece of basketry and a stone pestle. She sat upon the ground holding the basket in place with her legs and pounded the acorns most industriously with the pestle. Every once in a while the meal would be placed on the dise and tossed vigorously up and down on it. The finer oily parts were retained in the meshes, the coarser particles bounced back into the mortar and were reground. With infinite patience these processes were repeated from seven to ten times, until the meal was held so tenaciously by the disc that it had to be knocked off by repeated blows with a stick.

The extraction of the bitter principle is carried out by placing the meal in a leaf-lined depression in the sand and pouring boiling water upon it. The meal is thus purified. The top part is removed for bread. The remainder is transferred to a water-tight basket with some water in it, and the meal is rapidly cooked by placing hot stones in the basket. Any sand transferred to the basket settles to the bottom and does not contaminate the mush. The meal reserved for bread is often mixed with 5% of a special ferruginous clay and baked at a low temperature over night. The iron oxide removes the remainder of the tannin, and the slow cooking and, possibly, enzymic action converts some of the starch into sugar. It is a very great surprise to find that the bread is thus converted from a tasteless or slightly bitter dough to a decidedly sweet but very dark cheese-like bread. This is very highly prized, even above cake, by both Indians and some white people.

Several of these processes are certainly very novel and worthy of being patented. They present the Indian in a new light as an ingenious inventor, well worthy of study by the chemists of the Chemical Foundation, or by any other person scientifically inclined. In most of these operations the Indians antedate the chemists by perhaps many hundreds of years.

SOME NUT INSECTS OF IMPORTANCE IN MARYLAND

By Ernest N. Cory, State Entomologist, College Park, Md.

There are a great many insects that attack nut trees, their foliage and the nuts themselves, in this state, but for the most part their activities are decidedly sporadic and not of enough consequence to warrant special control measures. However, there are a few insects that seem to be pretty generally distributed over the state, and that appear each year in some portion of the nut growing territory. I have limited the number of insects that I will discuss to six that might be considered as major pests. Enough is known with regard to the life history and habits of these six pests so that we can give you a schedule of control operations that should give a fair degree of protection to your plantings.

Black walnuts, Persian walnuts, pecans and chestnuts are the nuts that have been planted generally in Maryland. Of course, there are large quantities of native black walnuts, white walnuts or butternuts, several varieties of hickories, chinquapin and hazel nuts which, in general, complicate the control of the insect pests. Certain sprays and grove practices, however, if followed with regularity, will control the major pests.

Insects that Injure the Buds

Two pests, requiring attention early in the season, injure the new growth, and if not controlled will continue to injure the foliage throughout the season. They are the Pecan Shoot Borer, *Acrobasis caryae* Grote, and the Pecan Bud Moth, *Proteopteryx bolliana* Sling. Either of these pests is capable of so retarding the growth of the pecan and Persian walnut as to make a difference of many years in the bearing age and a stunting of the tree that is anything but desirable.

The Pecan Shoot Borer

This insect starts its injury when the buds are just beginning to unfold. The fleshy leaf stems at the terminals are bored by the larvae starting at a point some distance above the attachment. The larvae generally work their way downward and the leaf withers and dies. The point of entrance is usually marked by a conspicuous mass of black

pellets held together by a slight web. The larvae also work at the base of the leaves, usually concealed beneath the flimsy webs in which is mixed pellets of excrement. The larva is light brown and nearly half grown at the time the first leaves are unfolding. When insects are fairly abundant practically every terminal will be hollowed out or entirely eaten. This feeding sets back the tree until a new set of buds has put out.

There are apparently two full broods, and possibly a third brood, of this insect during the year. The larvae live over winter in silken cocoons at the base of the buds. In early spring, possibly by April 15, the young larvae begin to bore into the buds, and later into the shoots as the leaves are unfolded. At College Park the larvae are possibly half grown by May 1st. The first pupae have been found outside on May 28th, but doubtless pupation takes place about the 15th as adults are found commonly from the last of May to the first week in June. A second lot of full grown larvae appears upon the tree about July 16. These larvae frequently web together leaves upon which they feed. A second lot of pupae occurs around the 20th of July and adults begin to emerge by the 29th. The pupal stage is somewhat short at this time, the minimum observed being five days and the average about ten days. It is possible that a third brood may occur under favorable conditions as the total life cycle does not average more than forty days. In that period, in any event, eggs are, no doubt, laid by the second brood and the larvae feed for a time and then spin up in their winter hibernacula at the base of the buds.

The control of this insect may be effected on small trees by collecting the larvae from the withered shoots and destroying them. Spraying with arsenate of lead when the buds are first beginning to unfold will undoubtedly check the pest. A second application should take place about July 15th and a third application during the second week in August.

The Pecan Bud Moth

The larva of this moth is a pale green worm which bores into the unfolding clusters of leaves in the early spring. It begins its work after the shoot borer starts to feed. During the latter part of the season it develops on the foliage. This insect probably lives over winter in hibernacula on the tree. Eggs have been found as late as October

2nd at College Park, indicating that the larvae hatching therefrom will probably live over winter. Pupae have been found as early as April 8th, but it is believed that this is an abnormally early date. The major injuries seem to occur in late May and early June. The first adults have been taken on June 27th. The second brood seems to extend over a longer period, the adults having been taken from July 31st to August 19th. The final adults appear about the first of October.

While no control measures have been practiced against this insect it would seem that the three arsenical sprays advised for the shoot borer would be effective in controlling this pest.

Late Appearing Insects that Defoliate the Trees

The Walnut Caterpillar

(*Datana intergerrima* G. R.)

The larva of this insect is nearly black, clothed sparsely with long silvery hairs, and when full grown measures about $1\frac{1}{2}$ inches long. When disturbed the larvae have the curious habit of elevating the head and tail ends of the body. They completely defoliate the limbs upon which they occur and sometimes devour all the foliage on small trees. The major injury occurs in the state about the last of July or the first week in August. In the South there are two full broods, but here, apparently, there is only one brood. The pest is easily controlled by spraying with arsenicals.

The Fall Web-Worm

(*Hyphantria cunea* Drury)

The larval stage is a hairy, white caterpillar that lives with a large colony of similar caterpillars within a web surrounding a group of leaves and twigs. As the larvae grow, the web is enlarged and ultimately a colony will destroy large amounts of foliage.

The first generation does little damage as a rule, but frequently the second brood devours considerable foliage and leaves ugly unsightly webs on the trees. Like the walnut caterpillar, this pest is easily controlled, and it is believed that the timing of the sprays as given on the schedule will be effective in preventing major injuries by leaf feeding insects and tend to promote earlier fruiting and better shaped trees.

Insects That Injure the Nuts

There are a number of weevils and curculios that injure nuts, but

their life histories vary to such an extent that it does not seem wise to give a detailed description of them in this brief talk. The grower who wishes to get detailed information on these pests should refer to West Virginia Bulletin No. 128 and U. S. Department of Agriculture Bulletin No. 1066. There is a fly maggot that injures black and Persian walnuts known as the Walnut Husk Maggot (*Rhagoletis suavis* Loew), that has been doing considerable damage to Persian walnuts in this state, which seems deserving of special mention.

Walnut Husk Maggot

The maggots attack ripening black and Persian walnuts doing a three-fold injury. In the case of Persian walnuts the eggs are deposited in the husks at a sufficiently early date to prevent the development of some of the nuts. In addition, the black juices that surround the area of infestation stain the shells so that the nuts are not desirable from a marketing standpoint. In addition, the feeding of the maggots renders it difficult and disagreeable to remove the husk from the nut. In black walnuts the ovi-position takes place at a later date, therefore the nuts mature but the feeding of the maggots makes it impossible to get the nuts thoroughly clean of the outer husk. This, however, can be overcome by the present method of polishing black walnuts.

The adult insect that causes this injury is a fly about one-third inch in length, pale yellow in color, marked with dark brown. The female lays eggs in punctures in the husks and the maggots which hatch from the eggs feed beneath the husk. The maggots are about one-half inch in length. They pupate in the soil in the fall and the adults emerge the following summer, beginning about the middle of July.

The first evidence of injury is likely to be a small blackened puncture from which there exudes a gummy liquid which runs down the side of the nut and stains it black. When large numbers of maggots are working beneath the husk the whole nut has a blackened appearance. These nuts fall to the ground prematurely.

Experiments by the Department of Agriculture indicate that a spray early in August with arsenate of lead, either sweetened or unsweetened, will destroy a large percentage of the adults before they have a chance to oviposit. This is the same system as used against the apple maggot in the north. It has been found that sweetening the

sprays is unnecessary in the control of the apple maggot, and it is possible that good results may be obtained by spraying walnuts without the addition of the molasses.

Insects That Injure the Twigs

The Pecan Twig Girdler

(*Oncideres cingulatus* Say.)

Probably the most commonly noticed injury to pecan trees is that caused by the girdling of twigs. This girdling is accomplished by the female of the pecan twig girdler. Ordinarily, the insect begins to girdle a suitable twig and then lays about eight eggs beneath the twig or leaf axils. After the eggs have been deposited the beetle returns to the work of girdling the twig and continues until the twig falls of its weight or the wind snaps off the twig which is almost completely girdled. The larval and pupal stages are passed within the twig. Apparently moisture is necessary for the development of the insects as eggs on twigs remaining hanging in the tree do not develop. The larvae excavate the entire interior of the twig and pupate in late August, the adults emerging in September.

Since the twigs lie on the ground all winter it is easy to collect and burn them. However, it must be borne in mind that this insect also feeds on hickory, persimmon, linden and a number of other forest trees so that reinfestation is likely to occur from such sources. Investigations in Texas indicate that a considerable degree of control can be secured by a thorough spraying with arsenate of lead.

Schedule of Control Operations for Nut Plantings

Insects to be controlled	Treatment	Date
Pecan Shoot Borer Pecan Bud Moth Walnut Caterpillar Fall Web-Worm Walnut Husk Maggot	Arsenate of lead 1½ lbs. to 50 gals. of water.	1st application about April 1st or when buds begin to unfold. 2nd application July 15th. 3d application, second week in August.
Twig Girdler	Collect and burn fallen twigs.	In late fall or winter.
Nut Weevils	Fumigate with 1 oz. carbon bisulphide per bushel of nuts. Destroy worthless nuts.	Immediately after harvest. Practice these treatments from the beginning of fruiting to prevent any accumulation of weevils.

THE DESIRABILITY OF THE CHESAPEAKE PENINSULA FOR NUT GROWING

By Ernest Hemming, Easton, Maryland

It gives me great pleasure to speak to you here because I like to think that you are somewhat in the same relative position as I was myself some years ago, and that is looking for a locality where you could grow a particular plant to the very best advantage, where everything was working for you. The particular plant that I was interested in was boxwood. Now the boxwood grows as far north as Connecticut and as far south as North Carolina, and west as far as Kentucky. In that large area I figured there was some particular place that was better adapted than all others for growing it. I was working at the time with the nurseries in Pennsylvania. That was at the time when there were millions of dollars worth imported into the United States, and when the embargo came against the importation of plants I could not see why we could not grow this box in a domestic way to take the place of what was being imported.

I decided from evidence in the old gardens on the Eastern Shore that this was the right location to make a start for that purpose. Some nurserymen argued that you could do it just as well in Pennsylvania and other places, but it did not seem to me that that was true. While boxwood is hardy and will grow over a big area, in a young state the plants are tender. If you can bring them over the first one or two years they become more hardy. I was putting practically all I had into the business, as well as my labor, and I wanted to be quite sure to have everything working for me. We started the Canterbury Nurseries about five years ago, and I will let you judge for yourself what measure of success we have had.

If you will use the word walnut, and especially English walnut, you will see what I mean by the same relative position.

If you are looking for a location in which to grow English walnuts to make a profitable crop you ought to have everything working in your favor—suitable climate, soil, cheap land and everything that will insure success. I do not wish to take issue with you over any particular state,

as I am a plantsman, and when considering where to grow plants I would do so independently of state lines, or anything else.

The black walnut grows from Maine down to Florida, from Ontario down to Texas. It covers an enormous area, but somewhere in that area there is some latitude in which it thrives at its best. I live out by the B. C. & A. station, and for the last five years have seen them shipping a tremendous stream of black walnut logs 18 feet and 20 feet in circumference. I was told this had been going on for 25 years. If they have been growing that many walnut trees and shipping them out of Talbot County it shows very favorably that this is a splendid location. I am not particularly interested in black walnuts. It is a tree I always thought ugly from the artistic point of view. Because I have been engaged all my life in growing ornamentals it does not appeal to me, as it is more of a lumber proposition, but the English walnut does.

Now my experience in Pennsylvania with the English walnut was that it would not be profitable as an orchard crop. The climate was too severe on the young trees. Except in very favored positions and localities they winter kill and it would take too long to bring an orchard into bearing. This opinion comes not from the old trees but from watching the young trees in the nursery. The risks are so great they would likely eat up the profits in raising nuts commercially. You must get in a latitude or in a place where the soil, climate and everything is in your favor, and then you will be able to compete with the other fellow.

There is such a galaxy of speakers on the program that I shall have to stick very closely to my subject or I will encroach on others. The main point I want to get across is rather a commercial one. There is lots of research work going on in the colleges and the experiment stations. These generally are interested in an academic way, but my interest is in planting orchards where they may become a profitable industry. I do not know very much about nut orchards, but I do know that, as in every other business, there are two points to be considered—one is production and the other is distribution or market. For production you want to pick out a place where you can grow trees with everything in your favor. All my working life I have been growing plants where everything was against me, where we had to have green houses for

winter protection. The second thing you want is low cost of land. I think the Eastern Shore compares very favorably with any other locality in America in that respect. Right here within a few miles of the National Capitol we have land very reasonable. Now you want the right place and you want cheap labor.

In locating a nursery or orchard where there are other industries you are always up against it. Labor is always gravitating to those employments which pay the highest wages. Down on the Eastern Shore it is almost entirely horticulture and agriculture, so that you are not in competition with the industries that can pay more.

Another thing, gentlemen, you cannot have a successful walnut orchard on the Eastern Shore, even with everything in your favor, by proxy. You have to do it yourself and stay right on the job, that is if you want it to pay.

Now as to distribution or marketing advantages. You have all heard from a number of speakers the tremendous amounts of English walnuts that are imported annually. It is ridiculous to think that the money spent for imported nuts can't be spent here. It seems to me it is very un-American to think that with all our resources we can't compete with the European market. When a man goes into business and puts his all into it he wants to investigate very thoroughly. He wants to be quite sure that he is in a locality where he can produce his product at as low a cost as his competitors and that there will be a market for it when he has produced it.

There is one thought that I was rather depending upon Dr. Morris to emphasize, but he did not, and that is that while the population of the United States is growing tremendously the grazing area is contracting. All this points out fundamentally that the growing of food products is one of the things that you can tie to for the future. Dr. Morris is the authority, I believe, for saying that one pound of nut kernels is equal to three or more pounds of meat.

Now, you young men here, where could you find a better investment, even if you have other business, than to acquire land on the Eastern Shore to plant your trees and at least secure a good living and very likely a fortune for the future? I think, gentlemen, that covers the subject. There are evidences undoubtedly in favor of the Eastern

Shore being one of the best localities for the economic production of English walnuts. Two years ago the Canterbury Nurseries had shipped from Portland, Oregon, 200 English walnuts. We planted them as you always do one of those things that are a side issue. We planted them on the shore, not in nursery rows. They were all very nice trees, from 6 to 8 feet from the bud, alive to the tips. They were planted with some misgiving. The following spring, after exposure to the winter, they were alive to the tips. Now such a thing could not possibly have happened in New York State. Those Oregon grown plants would have been killed back. I assume it was the water and mild winters. This is corroborated not by the walnut trees alone but by other plants that are a little tender in their young state, such as boxwood. The dwarf boxwood make an annual growth of three or four inches. In Philadelphia and northward the annual gain of the same boxwood is not more than two inches, due to winter killing. I am pretty sure that of two walnut groves, one planted here and one planted in New York State, the one on the Eastern Shore would be brought into bearing two or three years earlier at considerably less cost. I think that the stars in their course will fight for any one who plants a nut grove on the Eastern Shore.

Dr. Morris: I believe that we must look upon nuts rather as a correlative than as a substitute food supply. With the present rate of increase it is evident that the people in future years will be living so easily upon an abundance of food that we can hardly comprehend the luxuries that they will have. Nut crops are to be a correlating food supply rather than a substitute food supply.

At this time Mr. Frank Pilch of the Rotary Club extended to the members and others present an invitation to a luncheon at the club hall over the new theater.

Mr. Neilson: I move that we adjourn for lunch until 1:30.

Adjournment.

Afternoon Session

The President: We will now take up the program and the first paper this afternoon will be that by Dr. E. C. Auchter.

THE RELATION OF THE EXPERIMENT STATION TO NUT GROWING IN MARYLAND

By Dr. E. C. Auchter, Horticulturist,

Maryland Agricultural Experiment Station

It is indeed an honor to be asked to address this 18th annual meeting of the Northern Nut Growers' Association. The importance of the nut industry in this country is being realized more and more each year. Any food product containing such high percentages of protein, fats and starch, and having a yearly value of several millions of dollars is bound to receive attention.

Naturally there has not been as much experimental work in nut culture in Maryland as in such states as Georgia, California, Louisiana, Texas, and other states where nuts are grown on a large commercial scale. The large fruit and vegetable interests in this state have resulted in our spending considerable time on these industries. The fruit growers especially have had several lean years, and we at the station have attempted to help them in increasing the annual yields per tree and per acre, and in combating insects and diseases, so that the cost of production could be decreased and the net returns increased. The fact that these people have called for our help more often and more persistently, no doubt explains in part why we have spent considerable time in assisting them to solve their problems.

However the Maryland station has always been interested in nut culture. As far back as 1900, the station staff co-operated with Mr. J. W. Kerr, of Denton, Maryland, in nut experiments. Mr. Kerr's collection of shellbark and shagbark hickories, filberts, Japanese walnuts, and other nuts were no doubt known to many of the members of this association.

In 1907 Professor C. P. Close, the horticulturist of the Maryland station, made a survey of nut growing in Maryland. The results of this survey, and general recommendations concerning grafting, budding, nut soils, fertilization, soil management, and suitable varieties, were published in 1906 as bulletin No. 125 of the Maryland Experiment Sta-

tion. Briefly, Professor Close found that the native black walnut, butternut, hickory, chestnut, beech, hazel and chinquapin grew well in all parts of the state. In southern Maryland, and especially on the Eastern Shore, many old trees of pecans and Persian walnuts were reported as growing well and fruiting heavily. Nut trees were also reported as doing well in other parts of the state except in the higher and colder mountainous counties of western Maryland.

In order to determine the range of country where different varieties of Persian walnuts and pecans were grown, to increase interest and to aid in the growth of the nut industry of this state, the experiment station distributed 74 Persian walnut trees in 16 localities in the spring of 1907. The following year about 300 Persian walnuts and 170 pecans were distributed in 56 localities among 77 persons, and in 1909 approximately 1000 pecans were distributed in 218 sections of the state among 459 persons. In addition to the above distribution, 12 nut tree orchards were started in several different parts of the state in the year 1908.

A report of these tests was published 10 years later in 1918 by Professor E. S. Johnston as bulletin No. 218 of the Maryland Experiment Station. The conclusions drawn were quite similar to those of Professor Close. It was found that native nuts grew well. Pecans and Persian walnuts seemed to do best in southern Maryland and on the Eastern Shore, especially in Somerset, Queen Anne's, Worcester, and Wicomico counties.

A row of Persian walnuts containing 12 varieties was planted on the experiment station grounds in 1908, and a row of pecans containing 16 varieties was planted in 1915. Very few nuts have ever been obtained from any of these trees. In fact it became necessary to remove most of the Persian walnut trees because of certain campus improvements before they were old enough to bear.

Indications are that such varieties as Hall, Rush, Nebo, and the Wiltz strain of Mayette will be more suitable for our conditions than the varieties most commonly grown in the southern states and California.

Many of the pecans have grown well, but considerable winter killing of the shoots has been experienced and very few nuts have been

secured. The Busseron, Indiana, Van Deman, Pabst, Stuart and Moneymaker are the largest trees at this time—twelve years after planting. It appears, however, as if such varieties as Busseron, Butterick, Green River, Indiana, and Niblack will be more suitable for conditions such as we have at College Park than the more southern varieties such as Stuart, Pabst, Moneymaker, and Van Deman.

Trees of the Stabler, Ohio, and Thomas black walnuts planted at the experiment station twelve years ago are growing well and have produced a few nuts. It looks as if these varieties should be suitable for our conditions.

I have outlined briefly the work which the Maryland station has done in nut culture so that you can see that the station has been interested for at least twenty-seven years in this industry.

We realize that much work and experimentation is necessary in developing a new industry and we are planning further studies.

In order to determine whether nut growing will be commercially profitable, under our conditions, we are hoping to plant an experimental orchard consisting of a few of the most promising varieties of black walnuts, filberts, Persian walnuts, and pecans at the experiment station next spring. We feel that a more correct idea of the possibilities of nut growing can be secured in this way than if the trees are simply planted about buildings or along driveways. In this orchard it is planned to study soil management, pruning, spraying and fertilization problems.

We hope to be of more assistance to the nut growers of the state than we have been in the past, and in co-operation with them to determine the possibilities for commercial nut growing in Maryland. In the meantime the experiment station will be glad to assist nut growers in every way possible.

ESTABLISHING A NUT PLANTING IN THE NORTH

By C. A. Reed, Associate Pomologist, U. S. Department of Agriculture

The objects most commonly sought after in northern nut tree planting at the present time logically arrange themselves into five distinct groups; 1st, ornamentation; 2nd, profit from nuts; 3rd, timber; 4th, conservation of a national resource; 5th, sources of food for wild life and domestic animals. While these overlap to a certain extent, in the main they are quite distinct, and before any planting is made the prospective planter should decide definitely what he hopes to accomplish, and then proceed accordingly.

Planting for Ornamentation

While nut trees will probably not share the popularity in ornamental planting now enjoyed by the American elm, the sugar and Norway maples, and various oaks, particularly the red, pin and willow species, especially at latitudes or altitudes where only the more hardy species will do, certain of the nut bearers are among the very best ornamentals for use in what might be called the Lower North, i. e., the region near the Mason & Dixon Line. Many are hardy much farther north. For instance, the black walnut, the beech, the Japanese and Persian walnuts are frequently highly satisfactory for decorative planting well up in Canada. Various hickories are among the most beautiful of all native species from the lower Great Lakes region east to Boston. Even the pecan, which is commonly rated as a southern species, is occasionally used with highly satisfactory effect nearly as far north as other species of hickory are indigenous. Fine specimens are known at South Haven and East Lansing, Michigan, and at Hartford, Connecticut. It should be borne in mind, however, that all these trees are frequently capable of adapting themselves to both altitudes and latitudes considerably greater than those at which they ordinarily mature crops of nuts, and, conversely, that northern species are often successfully taken southward by planting at increased altitudes. Magnificent specimens of nut trees are too often seen in effective use in northern landscapes for it to be necessary to dwell at greater length on this phase of nut tree planting. The point is, however, that nut trees do have their proper places in the landscape, either as single specimens or in groups or avenues, and that where they answer the requirements of ornamentation

and shade, whatever nuts they bear is just that much gain over what would have been produced by trees which do not bear edible products.

Profit from Nut Crops

A scientific answer to the question as to whether a nut planting in a particular part of the North will, or will not pay, can be made only where a planting in that region, or one like it, in so far as general environment is concerned, actually does so. Repeated failures, no matter how many there are or how long they may be continued, do not show that under different conditions results would not have been favorable. With the exception of three or four chestnut orchards in Illinois, one Persian walnut orchard and one filbert planting in western New York, and possibly a chestnut orchard or so in Delaware, there are no known instances within the region under discussion in which the nut crops from enough planted trees in a single place to dignify by use of the term "orchard" have yet been profitable except during exceptionally favorable years, such as seldom occur. The failures in attempted nut growing have been many, and, if published, they would comprise a lengthy volume, but at best they are negatively constructive and hardly worth cataloguing. There are, however, certain economic phases of the situation which must not be left out of consideration. In the first place, the native species upon which chief reliance must be made have been here longer than the United States has been a country. The American people in this part of the country have always had native nuts which they might have eaten, but they have neither developed the habit of consuming nuts as daily articles of food nor have the producers found it profitable to devote any considerable portion of their land to nut-producing trees. The kernels of black walnuts, hickory nuts, chestnuts and pecans are unsurpassed in palatability by those of any nuts in the world, no matter how long nor on what part of the globe they have been under cultivation.

Black walnuts and hickory nuts commonly bring but a dollar or two a bushel. Even at this price the demand is limited, and it does not profit the average farmer to pay for gathering, hulling and curing if he has also to pay freight rates to distant markets.

The people of this country are in no apparent need of more food. Perhaps the greatest economic question confronting the American farmer today is what to do with all the food which he is now producing.

His greatest worry is that there are too few mouths to feed. There is not a great popular demand for nuts as substitutes for other kinds of foods. Even if there were obvious and excellent reasons why nuts would make better foods than the kinds that the American people are using at the present time, it would be difficult to convince them that they should make a substitution, and it would be even more difficult to get them to put the idea into practice after they were convinced. Few things in the history of a people come about more slowly than do their voluntary changes in food.

But to drop the question of what to do with nuts after they are grown, and consider the matter of how successfully they may be grown in this part of the country, what is the situation? We find a number of choice species thoroughly well adapted to this part of the country. Some are indigenous; others have been introduced. Of the indigenous species there are as yet few variety orchards of bearing age. Such plantings as have thus far given a profit are of varieties either wholly of Old World parentage or of hybrid forms resulting from American X foreign crosses.

It ordinarily takes a long time to convert a wild species of plant into one producing a profitable commodity under cultivation. The only instance in which it has thus far been accomplished with an American nut-bearing tree or shrub to great extent is in the case of the pecan in the South. That species is now under cultivation over a vast area, but the uncertainties that are still not overcome are very great in number, and very little knowledge regarding its best methods of culture, its varieties, etc., can yet be put down as being so definite as not to be subject to further change.

In the North much progress has been made, considering the magnitude of the task. The Northern Nut Growers Association, aided by the State and Federal Departments, has long been seeking out the most promising seedlings for use as horticultural varieties. It has discovered a rather large number and has compiled a great fund of information as to the history, apparent merits, and general character of each. Much has also been learned about methods of propagation, all of which is basic knowledge.

So far as the development of a great commercial industry of nut growing in the North is concerned, it must not be expected that con-

ditions are ripe for it in the immediate future. The planting of any great area of good farm land having a known productive value for staple crops would be economically unsound at this time. There is no justification for recommending it as a means of profit.

On the other hand, times are changing. The great organizations of nut growers on the Pacific slope are now selling walnuts and almonds in one form or another during practically the entire year. Plans are under way in the South for establishing the pecan in the markets during the 12-month period of the year. One of the northern species, the black walnut, is just now making particularly rapid strides in the field of popularity. The kernels from one of the favorite ingredients for use in confections. They are highly palatable either raw or cooked. They hold their flavor in cooking. Eaters of ice cream insist upon having no substitutes for them. Prices to the farmer for black walnut kernels range from something like 30 to 60 cents a pound. Last year, 1926, a peak year in production, prices went to a low ebb, but the chances are that they will be high during the coming season, as the 1927 crop is generally very light.

There are no established prices for nuts or kernels of the cultivated varieties. In a few instances Thomas black walnut kernels have been and still are being sold locally for a dollar a pound, more or less. What the range in future prices for the cultivated nuts will be is wholly a matter of conjecture, but we may put it down as certain that fancy prices can not long be expected for any one kind of nut when good nuts of other kinds approximately as good can be had at lower prices. In other words, competition must be expected with the best pecans, Persian walnuts, almonds, filberts, chestnuts, Brazil nuts, pistache nuts, pine nuts, peanuts and others more rare, such as cashew nuts, Queensland nuts, pili nuts, sapucaya nuts and others. In this connection it is interesting to note that nuts of good grades can usually be had at wholesale in New York at approximately the following prices: pecans at 15 to 35 cents; Persian walnuts at 10 to 30 cents; almonds, 15 to 35 cents; filberts, 15 to 20 cents; Brazel nuts at 10 or 15 cents, and chestnuts at 8 to 15 cents.

But while this is all true, and the growing of nuts in the North is fraught with economic uncertainty, the industry is definitely under way, with indications that the present progressive pace will be continued.

Orchards are being planted, and more appear to be certain to come. Doubtless the results of the first will be largely failures, but it is inconceivable that with the start that has been made someone will not soon be making money.

The nut crops of the country, aside from those of the Persian walnut, almond and filbert of the Western Coast, and the cultivated pecan of the South, are largely by-products of the land. In the manufacturing world it is often the by-products of the factory that yield the profits. Regular lines are not infrequently run at a loss, while the ledger shows a favorable balance because of the by-products.

In agriculture, however, there is a tendency to scorn by-products. Not so long ago among farmers it was regarded as piddling to raise chickens. Less than six weeks ago the wife of one of the leading farmers of the county in which this meeting is being held remarked to the present speaker that she didn't know what she and her husband would have done had it not been for their chickens.

The farmers of Tennessee and Kentucky have been cracking black walnuts from the fields and marketing the kernels for more than a quarter century. Their annual income from walnuts, which are largely wasted in other parts of the country, must be fifty thousand dollars or more. This sum represents a return from two by-products, walnuts and labor, as it is the members of the family who do the cracking.

It is strictly within the field of by-products that nut-planting for profit in the North belongs at the present time. There are idle spots of rich soil now going to waste which should be used. There is no telling how large a portion of the nuts we are now importing each year from foreign lands might be grown in this way. Why should we let the Europeans and Asiatics supply our markets with nuts from their by-product land while we continue to neglect our own? That is the question.

Timber Growing

Certain of the nut-bearing species are among the most valuable timber-producing trees, and under right conditions planting for timber is well worth while, but it should be done under the combined advice of competent forestry and nut-growing experts. It is a special field so large, and in a way independent of the general purpose of this meeting, that it will not be discussed further in this connection.

Conservation of National Resources

There are altruistic persons who not only believe in but practice the planting of trees for the modifying effect they have on soil erosion, moisture retention and climate, but, like the timber-growing phase of planting, this is of secondary interest for the moment and will therefore not now be considered.

Source of Food for Wild Life and Domestic Animals

Large tracts of land are frequently set aside by our State and National Governments and thenceforth maintained as vast refuges for wild life. Provision is made for the growing of such kinds of food as is most acceptable to the birds and animals thus protected. The question is now being raised by biologists as to kinds of nuts that might be grown as a means of further attraction. This phase has been given no particular thought by nut growers. Their chief concern is to repel rather than attract such life, although no one knows whether or not the insects destroyed by the birds in spring and summer would not ruin more nuts than the birds themselves actually consume at harvest time. This, too, as well as the matter of planting for food for domestic animals, will be left for further discussion.

How to Establish a Nut Planting

Anyone can plant a few nuts somewhere. No nuts should be planted in poor, dry or wet soils. Preferably, unless they are to be transplanted, nuts should not be planteed when there is not abundant room for a tree to grow to maturity without being crowded. Forestry plantings can and should be spaced close together. Solid plantings are usually allowed from four to six feet each way and later thinned out. Orchard trees of such species as black walnut, Persian walnut and pecan should have a minimum of 50 feet. Japanese walnut trees should have 40 or 50 feet, and chestnuts about the same. For filberts 20 feet is believed to be enough.

For nut production budded or grafted trees of promising varieties are much to be preferred, but they are not always available nor within the financial reach of everyone. Seedlings are better than none at all. They may produce good new varieties, but if they should not they can be top-worked. There are three or four nurseries from which stock can be obtained of the most promising varieties and species now available from any source. Their catalogues should be consulted and de-

cisions made as to what is most desirable. No varieties of native species should be taken far north of their place of origin, except for test planting, unless their hardiness has already been established under equally rigorous conditions. In other words, the northern range of regular crop production of the pecan is not readily extended beyond its indigenous range. Likewise, the Stabler walnut from Howard County, Maryland, winter-kills in middle Pennsylvania, and the Thomas from Southern Lancaster County, Pennsylvania, is not hardy at Ithaca, New York.

Trees in the North should be planted in early spring, the earlier the better. A good rule is to get them into the ground as early as the soil can be worked. Dig large holes and fill in with top soil. For walnuts, hickories and pecans it can hardly be made too rich. If at all dry when the trees are put out, the soil should be drenched. A good plan is to place the roots in a barrel or tub of water the night before they are to be planted and to keep them there until the tree is actually set out.

Most nut trees have taproots. These can not be entirely preserved except at great labor in digging, which is unnecessary. Taproots two and one-half or three feet long are ample for trees from four to seven feet in height. If the trees have been bought from a nurseryman, the taproots will doubtless already have been cut. At planting time the tops should be pruned back in proportion to the extent to which the roots have been cut away.

After the trees have been put in place, they should be regularly attended during their entire growing period of the first year. The soil should be kept well tilled, so as to hold down the weeds and retain moisture. Henceforth, the trees should be attended much the same as are other kinds of fruit bearing trees.

Mr. Hershey: Why don't you tell them not to plant nuts?

Dr. Smith: Would you state a success in northern nut culture if you knew of one?

Mr. O'Dell: The first of the season (1926) the price of black walnut kernels was 75c. From that figure it dropped to 25c. The average was about 45c. We handle the kernels only and not walnuts.

The Secretary: Mr. Riehl told me that from his Thomas black walnuts he got 10 pounds of kernels from a bushel of 50 pounds of nuts and sold them in St. Louis for $1.00 a pound.

Mr. Weber: Kernels of black walnut seedlings last year sold in Cincinnati for $1.50 a pound.

The Secretary: For uncracked black walnuts the grocer pays about $1.50 a bushel.

Mr. Reed: There is now a hand-power machine made at Harrisburg that is proving to be quite satisfactory in cracking black walnuts. I understood that the manufacturer* was to be here.

Mr. Green: I would like to ask Mr. O'Dell what percentage of the kernels he gets.

Mr. O'Dell: It depends considerably upon the locality. We do not attempt to obtain whole kernels, or even whole halves. We have to sift them in order to remove the fine particles.

Mr. Green: Do you utilize that product in any way? An ice cream manufacturer told me that the most satisfactory way he found of imparting black walnut flavor to the cream was to use small particles of kernel.

Mr. O'Dell: It usually contains too much dirt and too many small particles for such use, and is only good for chicken feed. It would bring about 3c a pound.

Mr. Reed: You could doubtless get a good grade of oil out of it, but such an oil would probably be more expensive than other oils.

Mr. Barton: After the Thomas black walnut tree comes into fairly good bearing, how large a crop should one have?

Mr. Reed: There is really no basis for answering your question, because no one I know of has any number of such trees unless Mr. Snyder may have some. What is the best yield you have had from your Thomas trees in Iowa? Have you some topworked trees?

Mr. Snyder: My first grafted trees in Iowa were worked on four-year-old stocks and they began bearing during the second year following. There has been a gradual increase in yields from a handfull of nuts from the first crop up to about a half bushel to the tree at the present time.

Mr. Barton: How old are those trees now?

Mr. Snyder: That work was first done about 14 years ago, the roots are therefore 18 years old.

Mr. Reed: Do they bear quite regularly?

Mr. Snyder: As regularly as any walnut does. For instance, last

*Mr. D. F. Clark, Box 524, Harrisburg, Pa.

year there was a big crop throughout the State but this year there are none.

Mr. Wharton: I am contemplating the planting of six acres of land to nuts. What are the advantages of the Thomas black walnut over those of the English walnut?

Mr. Reed: The two are hardly to be compared. The Thomas black walnut is fairly hardy; the English walnut is not generally hardy in the East.

The Secretary: Mr. Reed, you spoke of two plantings. Then there is also Mr. L. H. Calloway's planting at Chapin, Ill., and the Whitford Brothers planting at Farina, as well as those on the Riehl and Endicott farms, which you probably have in mind.

Mr. Reed: Then there are four chestnut plantings in Illinois that are bearing paying crops. Referring again to black walnut plantings, foresters tell us that it takes from 35 to 40 years for the growth of walnut trees planted in forest formation to yield an average return of $5.00 per acre, and that even this is not to be depended upon. The yearly returns are undependable. It is a question therefore as to what extent foresters are advising black walnut for timber planting except upon cheap land. Perhaps Dr. Symons can tell us the extent to which it is being recommended in Maryland, particularly in this part of the state.

Dr. Symons: They are recommending planting loblolly pine on cheap land in this part of Maryland.

Dr. Smith: Mr. Chairman, I would like to ask one question. Mr. Reed gave considerable discount on a man planting nut trees. If a man had some land, what would you recommend as safe to plant on it?

Mr. Reed: I do not know that I get your point.

Dr. Smith: I observe that most Government publications are extremely conservative. Your remarks here are that way. With that same conservatism, what would you advise one to plant?

Mr. Reed: That would depend somewhat upon a man's circumstances. If he were a rich man I would tell him to consult the nurserymen and buy freely of what was most strongly recommended to him. If he were a poor man, and in debt, I would think about the interest he was having to meet and of other uses he might make of the land. I would try to think only in terms of greatest and most certain net profit from the land, regardless of whether it might be from corn or some other kind of a crop. Most farmers of this country have to make

money. The only basis we have for telling them what crops will pay is that of what crops have already done. Speaking more to your point, let us imagine a place near Easton, owned by a man who has decided to plant nut trees. He would not find a large number of varieties from which to make a selection. He would have to consult the catalogs of Mr. Jones, Mr. Snyder and Mr. Hershey. He would find that he could get black walnut trees of Stabler, Ohio, Ten Eyck, Thomas and perhaps a few other varieties, but they are the black walnuts more highly recommended. I have known of a Stabler tree near Washington for ten years and during that time it has had only about three good crops. At least two-thirds of the time the crops of nuts have been practically complete failures. Last year it had about five bushels; this year it has no crop whatever. Mr. T. P. Littlepage has some 30 or 35 Stabler trees set out in 1918. Last season, during their ninth year, altogether they bore perhaps six bushels of hulled nuts. The Stabler is the best cracker of any of these varieties.

Mr. O'Connor: Yes, Mr. Littlepage's trees bore six bushels of hulled nuts last year.

Dr. Smith: About how much corn would the land make?

Mr. O'Connor: About four barrels per acre.

Dr. Smith: What is the character of the soil about the old Stabler tree?

Mr. Reed: I would say that both its fertility and moisture supply are considerably better than average.

Mr. Weber: How far is it removed from other walnut trees?

Mr. Reed: It is practically alone, although there is a small tree some 200 feet distant.

Mr. Weber: Would that have something to do with the bearing?

Mr. Reed: Perhaps so, but the fact that during certain years the tree bears well would tend to discount any theory of lack of pollen.

Mr. O'Connor: Perhaps late freezes in the spring may have something to do with it.

Mr. Walker: Before Mr. Reed leaves the floor I would like to congratulate him on the talk he has given. I have attended a great many conventions and usually the speakers like to give the best side of the subject under discussion. Mr. Reed has given us a heart to heart talk. We are indebted to a man who will come before us and tell us frankly both sides of a matter in which we are interested.

Mr. Hemming. I have listened with a great deal of pleasure to

circulation is shut off. The leaves are quite yellow and the tree looks bad.

August 30th. Callus nearly if not quite together. I took my knife and cut the edges of the callus just a little thinking it might heal together easier.

September 30th. Callus has united, having jumped the gap and taken up the circulation nearly half way around the tree. The leaves are again green and the tree has a good appearance, which shows that it has again taken up the normal function.

October 26th. The tree seems apparently entirely recovered and healthy, although the denuded area has not entirely healed over. There is no evidence of further blight, and no more callus being thrown out. It has evidently become dormant for the winter. Evidently Morris No. 1 has a good deal of immunity, for this one dose has apparently not only cured it but protected it from further invasion up to this time. I have not seen any native American chestnut show anything like this amount of resistance following the injection of one dose, up to this time.

September 8, 1926. Tree apparently healthy, leaves of good color, made a nice growth this summer, and the old scar is almost healed over.

Apparently, from the above, it is possible to inject blighted trees of the chinquapin, chinquapin x chestnut hybrids, Japanese, and Chinese chestnuts and have them recover, but with the exception of a few cases, the American chestnut that is blighted at the crown will die off before enough ferment can be stimulated to protect it. However, in a few cases, especially if injected early in the spring, they may survive. I had some that had every appearance of recovering until I sawed the top off and grafted them. Then they were attacked with renewed vigor and died promptly. After a few injections it is altogether probable that the American chestnut will perform similar to other chestnuts that have a certain amount of resistance, like the Japanese or chinquapin.

Amount Necessary to Protect

One dose has apparently protected the Morris No. 1 hybrid.

Two have protected a Japanese.

One, two and three have not protected an American, although No.

100 had offered great hope until I ignorantly cut the top off and grafted it. It looked so good that I thought it was safe. I now know that that thing can't be done.

Some sprouts seem to have root systems that are of such low vitality as to die off under the shock and toxic products of the serum, as in No. 110 whose roots died without any evidence of blight perceptible.

Automatic Serum

As a source of immunity this must not be overlooked. When an area becomes blighted nature makes an attempt to check the invasion by building a wall of cells around it. This wall will be digested as the defensive ferment is formed and serves as a source of automatic serum. This, while detrimental when only a little immunity is present, becomes quite valuable as immunity develops, as frequently all that will be necessary is to start this activity. With this in mind I have made no attempt to cut away any blighted area unless there was danger of its encircling the tree before it had a chance to recover.

My Future Plans

Four years ago I grafted a chestnut on a chestnut oak. My idea then was to keep it growing on the oak for many years in an attempt to have scion and stock become congenial and form perfect union. I then made a blunder, for now after four years and the tree containing six burs, I have nothing, for the variety is known to be practically worthless. It might be used as an intermediary to regraft other better varieties of chestnuts. I therefore determined, when I saw the encouraging results from my antigen, that I would not make the same mistake again, and accordingly wrote to a large number of men asking their first and second choice chestnut, regardless of its blight resistance. From these replies I selected the following varieties and procured scions and grafted them here at Piketown:

Fuller for its good quality.

Boone for its early ripening and regular bearing.

McFarland for its hereditary qualities.

Rochester for its thrifty growth as a stock.

Dan Patch, Riehl No. 62 and 68, Champion, Paragon, Drescher Merribrook, Parry, Old Barndoors, and others for various reasons.

Most of the grafts are growing nicely and many of them have

NUT TREES SUITABLE FOR THE CHESAPEAKE COUNTRY

By J. Russell Smith, Professor of Economic Geography, Columbia University

But for the natural modesty of the people of this Peninsula I should insist that their country was a good piece of country in general and especially adapted for the nut business. However, I must mention its relative frost immunity, its good rainfall, and its easy tillage. The land is ready and the trees are ready. There are at least seven species of nuts, most of them with many varieties and hybrids, now ready for commercial growing on the Eastern Shore. These seven nuts are the American black walnut, the hickory, northern pecan, Japanese walnut, the filbert, the hazelnut, and the English walnut.

1. *The Black Walnut*—I mention it first because it is absolutely native and absolutely adjusted to the climate. We have a natural yearning for the far-fetched but the well tried is far safer. I also mentioned the black walnut first because it seems without doubt to have the largest potential market. It is the cooking nut of the future. It carries its flavor through the oven as no other nut does and in the present and coming era of machinery and factory-made food products, walnut cake, walnut ice cream, and walnut candy give the black walnut a bigger field than the dessert nut market which is now so nearly monopolized by the English or Persian walnut and the salted almond.

Several varieties of grafted black walnut trees are available in the number of some thousands in commercial nurseries, and the nurserymen can be depended upon to scratch hard to keep up with a larger demand if one develops.

2. *The Hickory Nut*—Several species of hickory are at home in this peninsula. As the hickories hybridize quite freely, there are now dozens of hybrid or pure strain hickories ready for commercial propagation. Just at present the demand is ahead of the supply, but nurserymen can be depended on to right that in a short time.

If any one has some cut-over timber land containing hickory sprouts ready for grafting he can start grafting them himself in place. This is

much the easiest and cheapest and quickest way of starting the hickory business. I expect most of the hickory nut supply to come from such trees growing in permanent pastures, often rough pastures. Now is a good time to begin. Scion wood can be obtained if trees cannot.

3. *The Northern Pecan*—The pecan lifted over the fence from the southern forest to the southern orchard is now the second nut of America in commercial production. This tree is also native in southern Ohio, in Indiana, and is even growing and bearing in Nebraska. In the north also the progress of catching parent trees and taming them has taken place as it did at an earlier day in the South. The gigantic trees of the Chesapeake country seem to show by their century of success that some northern pecans are absolutely adjusted to this climate. The quality of northern pecans is better than that of the South. Several varieties of grafted trees are now available in commercial nurseries, and specimens of them are bearing well in this climate.

4. *The Japanese Walnut*—I mention it fourth because of its apparently absolute climatic adjustment to the climate of the southeastern United States. The trees from China and Japan suit us much better than the trees from Europe because the European summer climate is cool in the northwestern part and dry in the southern part, therefore the European trees have not been subjected to the fungus test which the first Maryland summer gives them. Contrast this European climate, from which we transplant so much of our agriculture, with the summer of Japan and China, which reeks with hot humidity. Hence the great vigor of many oriental trees that have survived it and have been transplanted in this country. One or two varieties of Japanese walnut, called heart nuts, are on sale at the nurseries. They are very swift growers and prolific producers.

5-6. *The Hazelnut and the Filbert*—These are cousins. The hazelnut is native to America, the filbert to Europe and West Asia. The hazelnut is a weed in many parts of the United States. Several varieties have been selected for commercial propagation and are on sale. It is a quick grower and prolific.

The filbert has long been an important commercial nut in Asia Minor and various parts of Europe.

Not long ago we thought they were comparatively worthless in

this fungus country because they are subject to blight. More promising strains seem to be coming forward.

The hybrids of filberts and hazelnuts are promising. Any one who wants a little fun ought to visit the nursery of Mr. J. F. Jones of Lancaster, Pa., and see his display of filberts produced by crossing with the American hazelnut. Some of them are six inches high at the end of several years and some are ten feet high at the end of several years—a great thick bush clustered with nuts.

Many varieties of filberts and their hybrids are on sale at commercial nurseries.

7. *The Persian Walnut*—Commonly called English walnut.

This is first in present economic importance in American nut culture. I mention it last because it is the least adapted climatically to this climate. The tree, native to Persia, has wandered to America by way of Europe. Our sole dependence thus far is on trees of this origin, and as a result we have many tender strains. However, this species appears to have as many variations as the apple.

The thousands of Persian walnuts that are grown in the United States from Massachusetts to Oklahoma by way of New York and southern Michigan have proved themselves almost infinitely variable regarding fruiting, flavor, tendency to blight, and frost injury. From this welter of possibilities a number of the best varieties have been selected, and trees are for sale in the commercial nurseries. Meanwhile I would suggest to the Peninsula landowner another policy, possibly the best of all policies. Find among the many Persian walnuts that are growing and doing well here one that seems good enough to propagate on a commercial scale. If you do not know how to do it yourself Mr. Jones or Mr. Hershey will raise a few hundred or a few thousand for you. If you wish to plant seedling trees they will probably be intellectually interesting and in most cases worthless, or relatively so as to fruit. The person who tries to make a commercial orchard of seedling trees belongs to that large class of whom it is reported that one is born every minute.

As to technique of growing nut trees, first of all I suggest your dooryard. Nothing is more majestic than a pecan tree, while the black walnut and Persian walnut and hickory need but to be seen at their

best to be appreciated. These trees are excellent lawn trees because they are not hard on the grass. They are interesting to watch and it is delightful to pick up their nuts. The hazels and filberts are also excellent yard material. I am taking my own advice on this nut shade business.

As a commercial basis a nut industry on the Peninsula needs but the application of energy and brains and capital, but the person who starts here and now to depend on nut trees as his only source of income is either a capitalist with some other source of income or a fool. There is always no one crop agriculture anywhere in the world that has proved itself satisfactory for any long period of time. Hence the most important advice I would give is to go slow and learn as you go. One crop agricultures are a poor dependence because they tend to be uncertain in yield and because of the element of overhead expense—the long season of no work when men and equipment have no work.

I would especially commend the idea of a two story agriculture. You have here in the Peninsula a wonderful series of agricultures of different sorts depending upon the different soils.

To the trucker I suggest that he set a few trees on his farm and go on trucking. I have seen excellent truck farms in New Jersey carried on between the rows of apple trees, which thrive on the cultivation of the truck farm. Go look at your famous pecan tree with a limb spread each way of 120 feet, a height of 120 feet, and a girth at breast height of 16 feet, 4 inches. It covers nearly an acre of ground. It requires fully an acre. To a truck farmer who wants to go into the nut business I suggest that he plant pecan trees in rows 150 feet apart, the trees 100 feet apart in the row and go on with his truck farming. The young trees will not rob much land, nor will they bother the machinery greatly. In due time the truckers will have majestic pecan trees under their absolute maximum possibilities of production and they will interfere with his machinery but little. This system of growing nuts is practiced in Europe. Nearly all the Persian nut crop of Europe is grown that way.

By the same theory the black walnuts should be planted in rows 100 feet apart, the trees 80 feet apart. Persian walnuts 90 feet by 75 feet.

The finest method of all for the nut industry on the level sandy loams of the Peninsula is to let the nuts be the second story of a pig farm—a pastured pig farm. Let the hogs harvest (hogdown) a succession of crops—clover, corn, cowpeas, soybeans, rye, vetch, crimson clover, possibly wheat. This is the new thing in hog raising. It eliminates the cost of harvesting. Therefore, the encroachment of the nut trees in this plan is not felt so much as a cost factor. You cultivate your nut trees. In so doing you produce a side crop. The pigs harvest it. This system is used in southern pecan orchards, makes nut trees grow, and should cause them to be produced at no cost whatever because the pigs should pay the expenses.

If you want to go into the nut industry without spending any money, plant seeds of these trees in the place where you wish the tree, cover them with earth, three inches of straw, protect them with stout stakes (very stout) and graft them when they are from two to six or eight years old. After these well established trees are grafted, you can expect nuts about as soon as you should expect apples from the slower varieties of apples receiving similar care.

If you are a sentimentalist, if your trees have someone who is not lazy to love them, you may plant your trees or your nuts down the lane, along the boundaries of the land, along the fences which separate your own and your neighbor's fields. They can be made to thrive in such places. Nature is raising millions of them in just such places; so are the French and the Swiss and other peoples of the old world .

The President: Mr. Spencer will read the paper prepared by Conrad Vollertsen.

FILBERTS FOR THE NORTHERN UNITED STATES

By Conrad Vollertsen, Rochester, New York

The improved European hazel or filbert really is a fruit or nut just adopted by the northern hemisphere, and is still, in our eastern and northern states, a very much neglected one. This is something of a surprise to me as ample proof of their doing well has been furnished abundantly year after year. I will admit a little time should be allowed for the selection of the proper varieties for certain locations in territories where climatic conditions may differ from that of their original place of growing. But even that can be overcome to some extent by planting several varieties, which always should be done even in small plantings for the sake of pollinization. One plant should never be set out, if there is not room for two or more. My advice would be rather not to plant any as it seldom proves satisfactory for want of pollinization.

My practical experience and close observation among filbert plants for the last fifteen years has without the slightest doubt convinced me that planting of filbert orchards for commercial purposes on properly prepared land is not at all a risky undertaking. I think quite the contrary.

On my little filbert plantation located a few miles south of Lake Ontario, Monroe County, New York, a trifle more than two acres are set out with plants for propagating purposes, propagating now all done by layering in my nursery—no more grafting. For that reason all wood on these plants is allowed to grow, even the so-called suckers coming up from the roots, a detriment to all fruit-bearing filberts. They are really not for fruitbearing, only for the growing of young plants, but are all I have of bearing age. They are the very plants that have furnished me for the last five years on an average full 500 pounds of well matured nuts per acre. In 1925 and 1926 we gathered of the same plants, though a year or two older, more than 600 pounds per acre, which I consider a very good crop from plants not specially grown for fruit.

This year the crop is rather light, particularly of some varieties. I do not expect more than about sixty per cent of a normal gather-

ing this fall. The unusually cold and rainy weather last March and April (the blooming season of the filberts) I believe is the cause of the light crop. No pollen was seen blowing in the nursery last spring —altogether too wet.

On two of my varieties, Burkhard's Zeller and Medium Long the catkins were frozen. They kept growing and tender on account of the rainy season until the real cold weather was actually upon them. But an off year should not discourage planting filberts. We have from time to time the same experience with almost all fruit, but for that reason we do not give up growing it.

I do not understand why so few people are interested enough to invest in filbert planting, when plants of the best varieties are and have been available at very moderate prices for years, and the assurance of their bearing quite well proven so many times.

It is true a good deal has been said about planting filbert orchards, and perhaps as much written about this matter also, but without avail. So far very little has been accomplished. I really believe a little less talk and a little more action would be more beneficial to the whole problem.

The planting of filbert orchards does not require a great outlay of money, as two year old plants of the best varieties can be bought for fifty or seventy five cents each f. o. b. shipping point.

If land of good sandy loam is available all the better, as such land is what all filberts prefer, but ordinary farmland, if not too heavy nor too wet, will answer very well. Filberts or hazel plants are not so very particular as to the choice of the soil. The land in my nursery is rather heavy and wet, but I grow fine young plants on it and, under the circumstances, satisfactory nut crops.

I can conscientiously recommend the planting of not only filbert orchards, but also the planting of a few kinds in every garden, where they certainly are an ornament and a source of pleasure throughout the year, with the foliage and fruit in the summer and the catkins in winter.

In setting out a filbert orchard my advice would be to set about 150 plants to the acre, one square rod to each and not, as heretofore has

been recommended, 12 feet apart each way, which has proven insufficient. Plants in my nursery are 12 feet apart each way, but are all now in contact with each other. 16½ feet each way will be ample, sufficient for all time, and give plenty of room for turning with plow and cultivator.

About eight to twelve varieties should be planted in an orchard, one-quarter of them of the smaller fruiting kinds for the sake of pollinization. I have experienced a little difficulty in selling to our merchants the nuts of the smaller kinds. It is unfortunate that an idea prevails among some of them, and for that matter among some of our people in general, that the small varieties of filberts are not so valuable as the larger kinds. This is altogether wrong. Most of the smaller kinds are more prolific, better flavored and all of them fill better.

In Europe for instance, varieties like Early Globe, Althaldensleben and Buttner's Zeller, all of the smaller sizes, are classed as some of the very choicest varieties and command the best prices on account of their fine qualities. It is a serious mistake to judge the value of the filberts by the size of the nuts. Invariably the small nuts will yield more kernels to the pound than any of the larger kinds and eventually the main sale of filbert nuts will be in a shelled state. As mentioned before, our merchants thought the above named varieties were a little small. Still they took them, together with others, in four and five hundred pound lots at a wholesale price of $20.00 per hundred pounds, where my retail price brings me 25c per pound. A number of my customers prefer the small nuts and order them only.

Now in setting out the filberts, after the land is properly prepared, 16½ feet distance should be allowed each plant each way, leaving ample room on end and side for turning with agriculture implements for cultivation, as the land should be cultivated freely and kept free from weeds.

Unless the land is very poor and stony, manure or other fertilizers should be used rather sparingly. Mulching the plants with old grass, straw or dead weeds has proven very beneficial to my stock plants in the nursery. It keeps the moisture and checks the weeds.

All filbert plants require a free and open location not shaded or overgrown by other trees.

All plants set out in the orchard should have but one stem, if such are to be had, and more than two should never be allowed. These stems should be kept free from limbs to a height of about fifteen or eighteen inches.

In pruning filberts I would above all call attention to the suckers which must be completely eradicated every season, or as soon as they make their appearance. The growth of suckers and the want of the necessary pruning will make the filbert in our gardens or orchards completely barren, nothing but rank wood will be obtained year after year. All plants should be kept well open in the center and if necessary some limbs must be removed entirely, not simply cut back. This is important.

The height of the plants should not exceed eight to ten feet. To accomplish this pruning should be done accordingly from youth up. Obstructing or contrary growing limbs should always be removed and a pretty shape of the plant as near as possible maintained.

Insects or disease so far have not troubled us, and no spraying has ever been necessary. Of blight not the slightest sign has ever appeared among our plants.

It seems to me that filberts imported from northern Europe stand our climate better than those from the island of Sicily, Italy or other south European countries. Our original imported stock plants from northern Germany are as healthty today as when planted fifteen years ago.

All land between the orchard rows could well be used for several years for small growing crops like potatoes, beets, beans, carrots, etc. The income from such crops would be quite an item towards paying for land and labor until the filberts produce a fair commercial harvest.

Question: How long does it take the filbert plant to mature and yield properly?

Mr. Spencer: I do not think Mr. Vollertsen said in his paper, but I understand that the filbert tree will bear in about four years.

Question: I do not know anything about the nut proposition, but some question seems to have arisen here as to raising nuts and the

risk involved without waiting for a number of years. Could not those interested try the filbert?

Dr. Zimmerman: I got some filbert scions from Dr. Deming three years ago. I grafted them and this year those scions were just loaded. I had the Du Chilly, the Barcelona and Cosford, and the one Dr. Morris called the Boneybush. In the six years I have been at Piketown I had never before noticed the native nuts bearing. This year was the first year also that the grafts had produced any nuts. Whether they had pollinated each other or not I do not know. I planted some other plants along the bank of a little creek and they are three years old this year. The Barcelona was quite full and the Du Chilly had a few on it. Out of the three-year-old plants the Boneybush was the only one that really failed.

Mr. Snyder: While we are on the subject of the filbert I want to say I have tried out some 25 varieties in Iowa and I have found only a few good for breeding purposes. The Du Chilly, Barcelona and Rush have been discarded. The Italian Red is the only one that stands the winter well. It is self-sterile and with a number of others it has been discarded in our plantings. I regard the filbert as being experimental in our state and just something to have fun with. I do not think it will ever be profitable there. I have some isolated plants of the Winkler native hazel. The staminate blossoms have been removed, compelling it to depend upon the Italian Red for pollen, as that is the only other variety nearby. In the same patch I have a Rush tree, from which I removed all its staminate blossoms, and compelled it also to depend upon the Italian Red pollen. These varieties bloomed early in March this past spring. We had some favorable weather. It was June before the nutlets became visible, but they developed satisfactorily and the bushes are now just loaded down with nuts. Hazels represent the only real crop of nuts we have in our part of Iowa.

FURTHER EXPERIMENTS IN INDUCED IMMUNITY TO CHESTNUT BLIGHT

By Dr. G. A. Zimmerman, Piketown, Pa.

It will be recalled that about a year ago, before this scientific body, I presented a preliminary report on "Induced Immunity to Chestnut Blight." I presented this subject as clearly as I knew how, and in the best English that I could command, and it seems that I have been misunderstood. Judging from the reports and the correspondence which I have received one would be inclined to think that I presented this matter as a settled proposition. In offering this second report, I wish it to be entirely clear to every one that my work is experimental and although I have not seen fit so far to change my past ideas and convictions, I reserve the right to reverse myself at any future time that a clearer vision makes that necessity imperative. There is a lot of difference between my ideas, convictions and preliminary experiences, and proved, conclusive, scientific facts. With the above clearly in mind, let me elaborate on my paper of last year.

In a previous report I used the term serum. This being vague and meaningless, I am substituting the term "endothic antigen" in the present paper. It will be recalled that last year I defined an antigen as "Any substance which when thrown into the system of any living body, will either kill the cells, or they will manufacture a ferment which will destroy it." This resultant defensive ferment is known as as an antibody. It is the thing—nobody knows just what—that enables any living substance to recover from disease and renders it immune. When once developed it is inheritable. Otherwise the Chinese seedling chestnut would be no more nearly immune to blight than an American seedling.

The ability of plants and animals to manufacture this defensive ferment is variable, depending probably on the activity of the cells, the age and activity of the antigen, the rapidity with which the antigen enters, and, in plant life, the time of the year, and also undoubtedly other factors. Every plant being a unit of its own, entirely independent of others, it is only natural that we should find great variation in the degree of immunity the various species and varieties of chestnut hold

to Endothia parasitica ,and with which variation everyone is familiar.

Our medical friends present will recall what we know as generally toxic conditions, like typhoid, diphtheria, and others in which the trouble is largely local, as acne, tuberculosis, and leprosy. We have the same condition in plant life. The generally toxic conditions either immunize quickly, or produce death with the same rapidity, while the locally toxic conditions are just the reverse. The chestnut blight is a locally toxic condition, and were it not for the fact that it goes around the tree instead of lengthwise, the tree would linger along for many years without succumbing. It likewise immunizes slowly. On the other hand the aphis infection causes a generally toxic condition, corresponding in a way to typhoid, diphtheria and others, and therefore immunizes quickly. It usually does not produce death unless the infection is very severe, except in the new growth, although I have seen small cherry trees killed outright in one season. Most of us, I suppose, have observed that a tree badly infected with aphis one season is rarely badly affected the following summer, therefore requiring only a relatively short time to immunize. I only mention this as a matter of interest.

In view of the fact that nobody knows just what takes place beyond the inner gates of the cells of living organism, a man who undertakes to deal with these conditions must of necessity be possessed with certain faculties in order to obtain maximum results. These qualifications I have roughly stated as follows:

One must first have an eye that can see into the future;

An antigen that is active against the target aimed at;

An inexhaustible patience and persistence, and confidence—such as is necessary in any undertaking.

To illustrate just what I mean: During the past year I got hold of an inactive antigen; one that not only did no good but harm, and plenty of it. A bombshell was exploded in my experimental field. I was stampeded, dumfounded. If I had not had an eye that could see into the future, and backed up with experience, I should have been defeated right there. However, I had a feeling that something was wrong. I did not know what. I immdiately prepared another antigen, used it bravely, and turned the tide just in time to save two of my most

interesting experiments, which I shall refer to later. Now I look upon this incident as being one of the most helpful lessons I ever received in immunization, although it delayed my progress to a considerable extent.

Last year I reported my notes on four specific trees, Nos. 100, 103, 106, and 112. I think I can probably give you nothing more interesting than to report additional notes on those same four plants, with one extra—a perfectly healthy tree. Otherwise it may be as a friend said recently while looking over the situation, "There are so many of them they cease to be interesting."

No. 100—Last report Sept. 28, 1926. Old stock died promptly after cutting off top and grafting, and four new sprouts had developed.

May 10, 1927. Grafted two of the sprouts with Burbank chestnut. Sept. 2, 1927. One of the four sprouts blighted at tip and then stopped. New sprout grew out at this point which looks healthy. Other sprout seems healthy.

One graft healthy. Other graft blighted a little at the top of the stock, opposite the graft. It rather looks as though all these sprouts have some resistance even though the old injected stock died. These plants received no more antigen this year.

No. 103—Last report Sept. 8, '26, graft was doing nicely with no further evidence of blight.

May 4, '27. Injected antigen. (Old and now known to be inactive). No evidence of blight and starting out nicely.

May 30, '27. Still looks O. K.

June 15, 1927. Blighted at union of bud and stock and extends into old injection scar (which was in the stock and not on the bud). Think perhaps it will come through without new antigen.

Aug. 31, '27. Went up to inject but hardly think it worth while. Probably will not recover.

Sept. 2, '27. Looks at bud as though it were gone (although I did not cut into the bark to make certain of this). It is rather unusual in that no sprouts have yet appeared as this is usually one of the first evidences when the entire circulation has been cut off.

It will be observed from the above that the two that did not hold up against my manipulations last year have not much more hope this year. No. 100 was not interfered with at all, except grafting two sprouts, but No. 103 had received an inactive antigen which probably

did it an injury. Even at that the blight is seemingly not very virulent and the stock below the injured area is healthy. Whether it will come out again in the spring is problematical.

No. 106—Sept. 8, '26. Reported tree looking splendidly, with blighted area well closed in.

May 4, '27—Injected antigen (5th dose). Tree looks fine.

May 25, '27. Noticed tree doing badly. Old area of callus necrotic. Injected antigen (6th dose).

May 31, '27. Injected spl antigen in two places. Former antigen ineffective. Bark and cambium necrotic almost around the tree. Only a little strip of live cambium (about one half inch) yet holding. It looks as though I am going to lose this tree.

June 15, '27. Tree looks better. Another spl antigen.

June 27, '27. Decidedly better. Injected another spl antigen.

July 11, '27. Very much better. Injected another spl antigen.

July 15, '27. Injected another spl antigen and still another in central limb. This limb looks as though it were going to be surrounded and die and this second injection is in the hope of saving it.

Sept. 2, '27. Many limbs and areas blighted, central limb above referred to is dying, but otherwise the tree is in good shape, bearing a quantity of burs. The strip of new callus at the root is now two inches wide, although there is quite a denuded area yet to cover.

No. 112—This is a plant of Morris No. 1 which was reported last year, you will recall, as having been blighted all way around the trunk, the callus jumping the gap, and on Sept. 8, '26, was in good shape. This tree had only one dose—not considered enough to protect, much less to cure.

May 4, '27. Right limb blighted. Second antigen injected.

May 30, '27. Antigen injected. Area of necrosis started in the old scar of last injection and is involving the old callus, half way around the tree. Plant looks badly.

June 15, '27. Looks so badly I believe it will die. My last antigen played havoc. North limb dead and it appears useless to give another injection.

June 18, '27. Still hanging on. Cut off north limb and gave a dose of antigen No. 2.

June 27, '27. Plant much better. Apparently recovering.

Sept. 2, '27. Tree looks nicely. Has a fine growth. Scar healing over beautifully, although not nearly covered as yet. Apparently this

plant was for the second time tided over by a single dose of active antigen.

No. 113—Aug. 4, '25. Tree one inch in diameter and healthy. Native American. Received antigen on this date.

Oct. 26, '25. Tree healthy but of course do not expect one dose to protect.

May 1, '26. Grafted to Merribrook,—a native American.

May 4, '27. Injected. No evidence of blight.

May 30, '27. Injected. No evidence of blight.

Sept. 2, '27. Tree apparently healthy, but has not made much growth. This tree evidently withstood two injections of inactive antigen with no noticeable untoward results other than probably a stunted growth. It will be interesting to watch its future performance, especially if it becomes infected.

The action of No. 103, whose bud became infected, would rather indicate that the action had not received much resisting quality from the stock. Neither did it have any before being placed, as it was taken from Fuller, a non-resistant tree. This may be interesting in connection with the idea which some of us are entertaining of plaeing grafts of the finer American chestnuts on the stock of the more resistant *mollissima*. I might also mention that the performance of this bud was similar to others placed on the Chinese stock—the bud having become infected and killed the scion during the second year, as well as part of the limb of its host.

Any one who has seen the above experiments and is familiar with the conditions in our blight infected district could scarcely draw any other conclusion than that chestnut trees will immunize under induced antigen. The main question then is simply to carry it to a point at which it will inhibit the progress of the invading fungus, or destroy it. This I am optimistic enough to believe will come about in due season. I, for one, am willing to wait the outcome.

The question has been asked time and again, "What is this material you are using?" It is an antigen, prepared from the dead bodies of Endothia parasitica, a fungus which invades and destroys the cambium layer of the chestnut tree, and is recognized as the cause of this perplexing situation which has played havoc with our chestnuts and destroyed our finest timber, to an extent that is incomputable from a monetary standpoint.

There are at least ten methods of preparing antigens, and there is some speculation as to which is the best. I have always held that the simpler method of doing anything is the better and I am striving for simplicity in this matter. The most simple method I think is to grow a sufficient amount of the fungus on suitable culture media, suspend in saline solution, kill, preserve and it is ready for service. Of course all understand that this is the work of a trained bacteriologist. Some of the methods I am using at this time, however, are not quite so simple. Naturally, after so short a time, I have not been able to make an antigen that is my ideal. That is a goal which I will still strive to attain.

Concerning the matter of injection I wish to say that at present I have found that to make a T incision, pry the bark loose from the vertical portion, paste some tough paper over it with hot paraffin forming a little pocket, filling the pocket by using a medicine dropper and sealing with paper and paraffin is my method of choice. How long I shall use this method I haven't the slightest idea. I think a more nearly ideal way would be to insert the fluid under the bark with a needle, providing a suitable antigen could be made. I am now experimenting with a little antigen in which the active principle is so nearly in solution that I am entertaining the hope of successfully using it with a large needle. If this one is not satisfactory, I shall try another as this method of injecting will have considerable advantage, especially in small plants, although there are many obstacles to overcome before it can gain prestige over the above mentioned method. Several other methods are being used with a variable degree of success and practicability.

What shall we try to immunize? Last year I made the statement that I did not believe it practical to attempt to immunize all the plants in the forest. Besides we would not have much if we did. I therefore planned to immunize a few varieties to a high degree. This plan I am still holding paramount. I have no doubt that after as much work has been done along this line as has been done on the automobile, aviation, electricity, etc. many things may be accomplished which we do not deem feasible now. But in order to do it one must have access to a great deal more antigen than I have thus far felt disposed to make.

Most of us, who had the opportunity as boys, remember favorite chestnut trees which produced exceptionally fine nuts of very large size.

I remember seeing pure American chestnuts that were considerably over an inch in diameter. Older men throughout the chestnut area may still identify the exact trees which produced these exceptional nuts. These trees are, of course, dead, but some of them still have a few sprouts and, being seedlings, these sprouts will reproduce the original. One of the greatest assets at this time would be the locating of a few of these splendid plants, for it seems to me that nothing else in the forestry line is so desirable. And this brings me to another point. Perhaps I am going off at a tangent into space, but sometimes it is necessary to do such things in order to get a clear conception of what we really need.

Up to this time I have laid stress on the chestnut for its valuable nut alone. If the loss of the nut of the American chestnut were the only item, it seems to me that we could very readily reconcile ourselves, but it is not. The chasm formed by the loss of the lumber is the greatest one to bridge. I have eaten Chinese chestnuts that were so fine in quality that they compared very favorably with the average American nut. But tell me, if you will, where we can find timber that sprouts so readily from the stump after being cut over, grows so straight, that is as hard and takes as fine polish, that is as free from knots, and that is as resistant to the elements as the American chestnut wood. There was no limit to its usefulness. Can we expect the Chinese chestnut to fill this vacancy? Perhaps. But it is well to remember that the blight has undoubtedly played on them so heavily through the ages that they have given up their tall slender growth for other forms not so desirable for timber purposes. If the American chestnut were to go through the slow process of nature's method of immunization, the chances are that it too would take on this undesirable character, whereas, if we induce a rather high degree of immunity over a comparatively short period of time, the tree will still retain its natural habits. This is why I am so anxious to find a plant that bears a very large nut of good quality. I feel that it is practical to have both a nut tree and a timber tree combined and so far as I can see, this scheme is the most logical method.

Last year stress was laid on experiment No. 100, which was apparently well on the way to recovery until I foolishly cut off the top and grafted, after which it became reinforced and rapidly succumbed. Dr. Morris in his discussion referred to the significance of this incident.

This thing is much more important than I realized at that time, for it means that immunization in this district is pretty nearly a matter of treating blighted trees and curing them. Trees that are so nearly normal that one cannot judge them to be otherwise, become badly infected just as soon as the top is removed for grafting purposes. Then there is another consideration. It is perhaps possible that some of the scions placed on certain stock are more or less incompatible and do not properly nourish the stock, and, after grafting, the plant performs very much as one does that has most of the top removed. Such cases would, according to experiment No. 100, immunize with considerable difficulty, if they did not die altogether.

I stated above that I was convinced that a plant would immunize under induced antigen. I just want to cite two reasons for believing this. First, when an endothic antigen is placed in the pocket of the plant for the first time, it practically invariably kills the cambium, especially on a pure American chestnut. Succeeding doses act with less destruction, until after several have been given there is very frequently no destruction whatever. This means that something has happened to give the cambium more resistance.

Second, the blighted area heals over under the influence of an active antigen, frequently covering the wound as evenly as if there had been no infection. I am submitting to you a small branch of a blighted tree, on which the blight area is healed over, and under no influence other than an injected antigen. In all the blighted chestnuts I have examined I have never seen this happen under any other condition. I have seen some healed areas but they have always been associated with a lot of callus and presented a warty, rough looking appearance, spoiling the timber for lumber purposes.

Another reason for believing this is that trees injected seem to hang on after infection beyond the point that one would naturally expect. To illustrate this, last summer I came to two trees of the native American chestnut, both blighted at the root. I picked out the worse of the two, this one being blighted in several places, and injected into it a dose of antigen. Two more doses were given during the season. The other tree was left untouched. These trees are about the same size and stand about fifty feet apart. Examination on Sept. 2, '27, showed the uninjured one entirely surrounded at the root, the area just above

very much enlarged, and ready to give up life at any moment. The other, although blighted at several places, is throwing out abundant callus, the areas enlarging and containing live bark underneath, and offers every prospect of hanging on to life. I think there is no doubt but that it will go through the winter. Even if it should die later on, it gives one an additional period in which to do something else, to bridge graft if it were so desired. Understand, I am not giving this as absolute proof. I am offering it as one of my reasons for believing that a plant does immunize under the influence of an antigen.

I want also to call attention to the fact that this immunizing business is not altogether one sided. No sooner is the first dose of antigen thrown in, and its defensive ferment begun to be formed, than the germs themselves get busy and, under the stimulus of the defensive ferment of the chestnut, which now becomes the antigen for the germs, they begin to make a defensive ferment which will enable them to live in the presence of the condition which the tree has set into action. And this is the way it goes. A see-saw back and forth, with "a survival of the fittest." This is the thing that takes place when various chemicals are used as poison. The bugs are continually immunizing themselves against the chemicals, which must in turn be used in increased amounts to protect our plants. To overcome this in the chestnut blight work, it will be necessary to make autogenous antigens from time to time from the then partially immunized fungus, thereby creating a new line of destructive weapons. This I am aiming to do as necessity demands, in attaining the high degree of immunity in the few selected chestnuts that I have in mind.

In closing let me state that I still believe I am on the right track. That we have the choice of either waiting as long as the Chinese did to get the *mollissima* immunized in the natural course through the ages, or injecting an antigen, and reaping the benefits of the resulting immunity during our own short life. These methods are before us. We can take our choice, not only in the matter of the chestnut blight, but pear blight, black knot in plum, peach yellows, and as many others, if you please, as we may feel disposed to accept.

The President: We will now take up the election of the committee to nominate officers for the ensuing year.

Mr. Olcott: I nominate the following men as members of the nominating committee: Harry R. Weber, Karl W. Green, Dr. W. C. Deming, J. F. Jones and John W. Hershey.

Mr. Spencer: I second the motion.

The motion was carried. After a recess the committee reported as follows:

Mr. Weber: Mr. President, the nominating committee is ready to report. We nominate the following:

President—Willard G. Bixby, Baldwin, N. Y.

Vice-President—Prof. J. A. Neilson, Vineland, Ontario, Canada.

Secretary—Henry D. Spencer, Decatur, Ill.

Treasurer—H. J. Hilliard, Sound View, Conn.

Dr. Deming: I move that the nominations be closed and the secretary be instructed to cast one ballot for the nominees.

Mr. Spencer: The secretary votes in favor of the officers nominated by the committee.

Dr. Deming. I wish to offer an amendment to the By-Laws. The National Pecan Growers Association has accepted membership for students and certain other individuals at $1.00. We have on our membership blank "Student membership $1.00," but I do not find on record, or in the Constitution and By-Laws, any statement of this provision for $1.00 membership. Prof. Colby, when he was Secretary, accepted student membership. I wish to offer the following amendment:

> "Article 2. Annual membership for all county agents, including home demonstration agents, for agricultural college and experiment station officials and employees, state foresters and U. S. Department of Agriculture officials, college and high school students, boy scouts, girl scouts or camp fire girls shall be $1.00"

The idea of this is not that we shall get many more memberships that will be a source of profit to the association, but that we may gradually get some officials and young people whom especially we wish to interest in nut growing.

Mr. Reed: I would like to move the adoption of that amendment with possibly the addition to that group of agricultural and horticultural editors. These people drop into the meetings occasionally. We would like to have them come oftener and feel that they are members. Prob-

ably it would be worth while. I would move the adoption of this proposed amendment with that inserted.

Mr. Spencer: I move the adoption of the resolution as amended.

Mr. Green: I think it would be well to say whether the amendment grants full membership privilege.

Dr. Deming: It should be a non-voting membership. Such members should be privileged to attend the meetings, take part in the discussions and receive the annual report, but should not be entitled to vote or hold elected office.

The motion was carried as amended.

Mr. Weber: I think the place of the next meeting must be proposed from the floor. I move that we meet next year in Toronto, and that we leave the exact date with the Executive Committee.

After discussion the motion was carried.

The President: We will now have the report of the Resolutions Committee.

Prof. Neilson: As Chairman of the Resolutions Committee I wish to present the following:

Report of Resolutions Committee

Resolved, That the Northern Nut Growers Association extend their heartiest thanks to the following organizations and individuals for many courtesies and efficient help in making the convention a success

(1) To Del-Mar-Va Association for effective work in making known in advance through the Press of the Peninsula the holding of the convention and the aims and objects of the Association.

(2) To the Talbot County Chamber of Commerce for arranging for spacious quarters for holding the meeting and for their courtesy in giving the members of the Association the pleasure of a tour of inspection of the East Shore District.

(3) To the Rotary Club of Easton for their courtesy of a luncheon and a pleasant social hour.

(4) To the managers of the Avon Hotel for their courteous attention which has contributed to the pleasure of all those who came.

(5) To President Grier of the Del-Mar-Va Association for coming to the convention and delivering an interesting and appropriate address.

(6) To the Canterbury Nurseries for the pleasure of an oyster roast and other courtesies.

(7) To E. P. Wallis, Chairman of the arrangement committee, and to the citizens of Easton generally for many kind attentions.

(8) To our retiring President, Mr. S. W. Snyder of Center Pt., Iowa, for efficient and faithful services during the tenure of his office. Mr. Snyder has done excellent pioneering work in Iowa in locating valuable strains of nut trees and in stimulating interest in the possibilities of nut culture in his state. His work is much appreciated and this is shown by the increased interest in nut culture in Iowa and other mid-western states.

(9) To our Secretary, Mr. H. D. Spencer, of Decatur, Ill., for his enthusiasm and active support of the program of this association during the past year. Mr. Spencer has been most enterprising and energetic in promoting the planting of nut trees in Illinois and in educating the people of his state along nut cultural lines. With his valuable experience of the past year we anticipate even greater achievement during the coming year.

The members of this Association also desire to express their regrets at the passing of an old and interested member, Mortimer E. Wile of Rochester, N. Y., and extend to the family of our late member our sympathy in their bereavement.

It was moved and seconded that the resolutions be adopted.

The President: With no further business before the Association, the motion to adjourn will be in order.

Mr. Weber: I so move.

Adjournment was declared.

APPENDIX

THE SOIL REQUIREMENTS OF NUT TREES

Willard G. Bixby, Baldwin, N. Y.

There are some subjects on which a person can best express his knowledge by saying, "what I don't know about this subject would fill a book." I felt this way when asked to present a paper to this convention on this important matter and feel so yet, but have gone ahead and prepared one in the hope that a most profitable discussion will follow. Dr. Morris has said that frequently the discussion will bring out much more than the paper. Necessarily much of what I present in this paper has been what has been shown at Baldwin, N. Y., checked more or less by observations elsewhere.

The first requirement for nut trees is to have the soil rich and so maintained. While we see results once in a while from land being too rich for best results with apples, I have never seen evidences of soil being too rich for nut trees. Like rhubarb and asparagus, they seem to be able to put to good use all the plant food you can give them. The particular plant food used at Baldwin has been largely stable manure (horse and cow principally) for fortunately so far I have been able to get what was required by buying what was offered whether I needed it at the time or not. It is all right to plant nut trees in waste places, around buildings, etc. but be sure that the places where they are planted have rich soil or that you are prepared to supply materials to make it so. It is possible that an exception in the rich soil requirement may have to be made in the case of the chestnut, for that tree is found native on soils that are poorer than that where other nut trees are native. The promptness with which the blight attacks chestnuts at Baldwin, however, has given little opportunity for observations on this point.

When we get beyond the fact of rich soil being needed and ask whether clay, loam, sandy loam, sand, etc. are best, evidence so far is to the effect that the material which makes up the bulk of the soil is of less importance than the requirement that the soil be rich in plant food and humus. An example in the case of a black walnut planted in sand is evidence on this point. There was in the field at Baldwin when I went

there, a place which a previous occupant had used as a dump for tin cans, old bottles, ashes, etc. Much of this was cleaned out and a large hole was the result. Digging a cold storage cellar under a portion of the house where there was no cellar gave me many loads of fine building sand, which was used to fill up the old hole. When the black walnut row was set out it was found that one tree would come right in the middle of the old hole. The tree was set there and notation made to see that it got a double portion of manure when the other trees were manured. This tree has grown as well as any of the row, and the soil around it has lost the sandy appearance it had for three or four years.

Perhaps the experience of the southern pecan planters may also be helpful in this connection. The pecan apparently is normally a bottom land tree and is pretty generally found in the bottom lands of the Mississippi River and its tributaries where the soils are alluvial, of great depth, and very rich. It has been planted on many kinds of soil and, barring such cases as being planted where there is ledge or hard pan near the surface, etc. it does pretty well as long as the fertility of the soil is maintained.

With possibly one exception, nut trees do not appear particular as to whether the soil be acid or alkaline. The soil at Baldwin is slightly acid, that at Lancaster, Pa., is limestone soil and probably alkaline, but with the exception of the English walnut nuts seem to do about as well at one place as the other. There is a marked difference in the case of the English walnut as to behavior, the trees doing much better at Lancaster. The soil at Lockport, N. Y., where the English walnut does so well is limestone also. One English walnut tree at Baldwin which is growing near where there was a large ash pile at one time is growing much better than the others. The English walnut trees at Baldwin are now receiving applications of lime to see if this will make them do nearly as they should.

There is one matter which perhaps is not exactly soil requirement but which is of great importance, and that is soil condition. I do not like to dig holes in sod land and plant nut trees. I much prefer to plow the land, fertilize it, and raise a crop or two that requires clean cultivation, such as corn, and then plant the nut trees. Observations have lead me to believe that nut trees planted in tilled ground are pretty apt to make much better growth than those in sod land even when those in tilled ground are planted a year or two later.

To sum the matter up I would say that, from evidence now in hand, nut trees are not particular as to soil requirements as long as a high degree of fertility is maintained. Exeeption should be made in the case of the English walnut which seems to prefer a limestone soil. It may also be neeessary to make an exeeption in the case of the chestnut which may be found to do about as well on soils of moderate fertility as on rich ones.

The above conelusions very likely may have to be modified as we get farther evidence, perhaps after the discussion which I hope will follow this paper. I have quoted Dr. Morris once in the paper and I do not think I can elose better than by quoting him again. In the early days of working out grafting methods, results one year, following out one plan of procedure, would be very satisfactory. Another year results from similar work would give very poor results. Accordingly procedures that were seemingly the best one year would be out of favor two or three years later. At a meeting, after Dr. Morris had given a demonstration of grafting where he had set forth the practice he preferred, some one called attention to the fact that this was at variance with what he had preferred two or three years before. His eye twinkled and he said "the one who in this work does not change his opinion is one who does not progress."

I certainly hope there will be a full discussion of this brief paper and those present will tell the meeting where their experience bears out the conclusions expressed here or does not.

THE REQUIREMENTS FOR AN EXPERIMENTAL NUT ORCHARD, A NUT ARBORETUM, A NUT PROVING GROUND

Willard G. Bixby, Baldwin, N. Y.

To those giving the above but casual attention it may be thought that they are simply different names for the same thing, but such is very far from being the case. The purpose behind each is to enable us to grow fine nuts in quantities large enough to make nut growing become the important branch of agriculture which we believe it is destined to be. But after you have said that, further considerations begin to show up the differences. We will note below briefly the important points of each.

The Experimental Nut Orchard is a collection of a relatively small number of varieties of each species of nut bearing trees and shrubs that have been shown to have good prospects for success when grown on a commercial scale. There should preferably be several trees of each variety. The principal purpose is to work out methods for getting the trees to grow and bear well, and at the same time test out the values of the different varieties under orchard conditions. There should be many such orchards one in each section of the country. They may include all species or be confined to a few or to one. The orchard of Mr. Thomas P. Littlepage at Bowie, Md., is a good example of such an orchard of northern pecans and of Stabler black walnuts.

A Nut Proving Ground is more inclusive and contains more varieties, it being intended to include all varieties where the nuts borne are good enough to seemingly make them worth while to grow if the trees are found to be healthy, good bearers, and not subject to insect and fungus troubles not readily controlled. Its function is really to ascertain nuts of promise from which to set out experimental orchards. Mr. J. F. Jones' older plantings at Lancaster, Pa., and my older plantings at Baldwin, N. Y., are good examples of nut proving grounds. There should be many such, one in each state, at least, and more than one in large states.

A Nut Arboretum is more inclusive still and cannot be so easily defined, but with the aid of examples it is believed that the necessity

for such can be made clear, also an idea given of the results likely to be obtained.

If it were a fact that we could get the best varieties of all nuts by simply discovering trees now in existence which bear them there would be no need for a nut arboretum. The problem would be simply to continue searches for fine nuts and test out the fine varieties found. In the case of some nuts satisfactory varieties have been found by simply discovering existing nuts. This is the case with the southern pecan. It is hard to imagine a variety more delicious than the Schley and this was simply a seedling tree discovered by the late A. G. Delmas of Pascagoula, Miss. In this connection I shall never forget the remarks of Judge Edwards at the Austin meeting of the National Pecan Growers Association which it was my privilege to attend. He said that he had a great admiration for the Northern Nut Growers Association for the remarkable work they were doing with the stubborn material with which they had to work, that in the case of the southern (the convention was an assembly of growers of southern pecans) all necessary to do was simply to select from what God in His bounty had provided, while in the case of the North it was necessary to resort to plant breeding and actually to originate what never existed before. I don't know that Judge Edwards ever considered himself a "prophet" or "the son of a prophet" but the wisdom of his utterance is now history. Those who have followed the matter most closely are convinced that while in the case of some nuts, notably the black walnut, we have varieties that are apparently going to be just what we want for orchard planting, in the case of others we have not, and that it is going to be necessary to resort to plant breeding to get them.

This can be made clearer by an example. In the case of the hickories which have been selected as worthy of places in nut proving grounds, because of the excellence of the nuts they bear, it is being gradually learned that a larger and larger proportion are hybrids. There is one class, hybrids between the shagbark and the bitternut, of which three varieties are being propagated, the Beaver, the Fairbanks and the Laney. The shagbark, Carya ovata, is, everything considered, the species of hickory which bears the best nuts, and yet the three varieties above named are larger, have thinner shell, and consequently have much more kernel and would sell all around the average shagbark hickory nut. In the case of the Beaver the shagbark tree

which bore the nut from which the parent Beaver tree grew is still standing, or at least was a few years ago, and the nut is a very ordinary one. The nuts it bears would be termed ordinary hickories and would sell for not more than a few cents a pound. The improvement effected by bitternut pollen on a flower of this particular tree has been remarkable. The bitternut tree which supplied the pollen some 50 years ago is not now standing but there is no reason to believe it to have been anything but an ordinary bitternut. All bitternuts bear nuts that are inedible on account of the bitter kernel, or more correctly on account of the bitter skin which covers the kernel. In the case of the Beaver hickory we have the remarkable case of ordinary+worthless=extraordinary. What would have happened had we had choice specimens of shagbark and bitternut trees from which to make such a hybrid? We can only imagine but in all probability it would have been way ahead of what we have.

We can note a fact from the science of chemistry which also may be helpful in showing that in other branches of science the most valuable of results frequently come from the union of seemingly unpromising material. Take the metal sodium for example. It would burn you should you touch it and kill you if you ate it. Chlorine also is a deadly gas that was used in the Great War to kill men by the thousands, yet when these two elements combine they form ordinary salt which is absolutely necessary for human existence. We do not know in advance the effect of combining different nuts any more than we do about different chemicals. We do know, however, that there are great possibilities.

There is another example in the case of the hazel. The hazels which bear the filberts of commerce are foreign species. The nuts are large and satisfactory as commercial varieties where they can be grown. Unfortunately, with the exception of a few favored locations, they bear very sparingly in the north-eastern United States. On the other hand the American hazel bears bountifully over most of this section. Much progress has been made in breeding hazels for the north-eastern United States by making hybrids between the Rush, the best American hazel that we have, and the best foreign hazels. While this work has been going on but a few years we already have hybrids bearing nuts larger than the largest foreign hazels, some of which are of great

promise. While the Rush is the best American hazel that we have, there is no reason to suppose it to be the best in existence, in fact it seems most unlikely that it is and that the improvement already made, great as it is, could probably be made much greater if we had better material to work with.

A nut arboretum is a place where is assembled all the best varieties of each species of trees or shrubs which bear valuable nuts. It should contain also trees which bear nuts outstanding in each particular quality, such as size, cracking quality, flavor, etc., even though they should possess undesirable qualities which would prevent the nuts from ranking high when all qualities are considered. It should contain also the best varieties it is possible to obtain of all nut species related to those which bear valuable nuts. For example in the case of the hickories it should contain the best bitternuts, Carya cordiformis, the best shellbarks, Carya laciniosa, the best mockernuts, Carya alba, etc., even though we have no varieties of these species that bear really valuable nuts. The bitternut is useful because it has thin shell and large proportion of kernel and imparts these qualities to its hybrids. The shellbark bears nuts way ahead of any hickory species in size, and the mockernut is the most rapid growing of the hickories, particularly on comparatively poor soils. The slow growth of the hickory is one of the things that has so far prevented its attaining the importance that the fine quality of our best hickory nuts would seem to warrant. To sum up, a nut arboretum should contain species of all nut trees and shrubs that seem at all likely to furnish material for breeding varieties better than we now have.

It may be asked why it is necessary to assemble all these varieties and species in one place. Why, for example, could not a choice shagbark tree growing in Massachusetts be pollinated with pollen from a superior bitternut tree growing in Iowa. While it may be possible to do some work with widely separated parent trees, yet usually such is very expensive and there is much wasted effort. Widely separated trees also cannot be properly observed except by having an observer in each place, which adds expense even if it can be effected, and this will many times be found to be impracticable. The female parent trees in particular should be conveniently located so that the growing hybrid nuts may be properly marked during the summer and protected from boys and squirrels during the fall. Those who have done plant breed-

ing are unanimous in their conclusions that for practical plant breeding work the material to be used must be assembled in one place. That the assembling of some of this material is not going to be easy is apparent to anyone who knows about it. There will have to be much traveling even after all possible has been done by correspondence, and the one doing the traveling should have expert knowledge so as to make wise selections of material. It is necessarily going to be somewhat expensive to gather this material and to give it the care needed to get results in the quickest possible time. There will have to be one or two persons commanding fair salaries, beside others doing the rougher work of fertilizing, cultivating, etc. The results the first few years will necessarily be somewhat meager, for the work of the first few years will be largely assembling material and getting ready. It is probable, however, that valuable preliminary work can be made by getting permission to make use of trees in existing arboretums. There are none that I know of that have more than a fraction of the material that should be assembled in a nut arboretum, but they have enough to enable a start to be made, even though it would be working under unfavorable conditions. It would also probably be possible to collect data as to the flowering dates of some of the various varieties and species. They frequently flower at such different dates that it is necessary to gather pollen from one section and ship it to another. The difficulty of getting these various factors to co-ordinate is such that sometimes it is a matter of years to effect a desired hybridization, although fortunately this not so generally.

As to the location for a nut arboretum it would preferably be where the largest possible number of nut species will do well. It should not be too far north or too far south. Long Island is pretty good but whether it is the best remains to be seen. I am inclined to think that a more southerly location might be better. Considerable study and observation will be needed before this point can be decided. While a nut arboretum would better not be located in a large city there are many considerations which make it desirable that it be not too far away from a city of reasonable size. A nut arboretum should have management and support such as to ensure continuous operation over a series of years. It would benefit the entire country, or at least a considerable portion of it. From that consideration it would seem as if the government should establish it. On the other hand there are serious practical

difficulties in the way of getting appropriations for a governmental project of this nature. Probably it would be far easier to get ten times the appropriations for the control of a new dangerous insect, such as the Japanese beetle, than it would to get appropriations for a nut arboretum. If funds sufficient to start it should be forthcoming, probably management by a board of trustees would be preferable. This is generally the way our colleges, hospitals, botanic gardens, etc. were started and have been built up.

The difficulties in the way of establishing a nut arboretum have been outlined above, also that there would be considerable cost of operation, but the value to the country of what would be accomplished would be such that the cost of establishment and operation would be so small as hardly to be worthy of consideration in comparison. The rapid increase in the use of nuts in late years has been beyond all precedent. Formerly they were sold by the grocers at Thanksgiving and Christmas time and scarcely any at other periods. Now we have exclusive nut stores which sell nuts all the year and shelled nuts are beginning to be put in 5c and 10c packages and are used for hurried lunches, or by those who want a bite to eat that they can eat as they go and have time for nothing else. Considerable effort also is being put on developing uses for nuts in the family in the form of nut butters and otherwise. It is generally admitted that there is only one solution in sight for the diminishing supply of meat and that is to grow nuts. A nut arboretum, as nothing else can, will improve the nut varieties that we now have.

There would, in all probability, be results achieved not contemplated in the above plans, which are not only possible but probable. One only will be mentioned. Most of the nut trees are valuable timber trees but generally are of slow growth. The work of breeding varieties for the nuts they bear is almost certain to get varieties valuable for timber as well. A hickory that will grow several times as fast as anything we now have would be of tremendous value to the forestry industry of the country, and it is likely to come from a nut arboretum. It is difficult to see how a man of means who really wanted to do something worth while could more effectively accomplish it than by establishing a nut arboretum.

THE PROPAGATION OF NUT TREES

SEEDS, SCIONS, TREES

By J. F. Jones, Lancaster, Pa.

The Selection of Seed Nuts to Grow Stock

The principle thing we have in view in growing under stocks for budding or grafting is to grow vigorous seedlings that will handle well in the nursery and that will furnish the root system for hardy, long lived and vigorous trees in the orchard. There is, therefore, no advantage in using seed nuts of grafted varieties to grow stocks, since the stocks are to be budded or grafted. Also, since the nut trees used for under stocks, or most of them, grow naturally in a wild state, there is much less variation in individual seedlings of the various species of nuts, except as they apply to conditions under which the trees are growing, than is the case with most other trees cultivated for their fruit. The selection of seed to grow stocks on which to bud or graft the finer varieties is, therefore, perhaps of less importance. I believe, however, that it will pay to select seed nuts from the largest and most vigorous trees. The quality of the nuts, as judged for eating, however, need not be taken into consideration, since the seedlings are to be grafted.

Stocks for Varieties of The Various Species

The black walnut, Juglans nigra, makes a good stock on which to bud or graft varieties of the English or Persian walnut, as well as the improved varieties of its own species. So far as we have tried them, all the other species of the walnut (juglans) do well on this stock also. The butternut, when grafted or budded on the black walnut or Japan walnut stocks, will no doubt be free from the root disease which sometimes shortens the life of this tree, and varieties of butternut should therefore be worked on either the black or Japan walnut stocks. We have used both very satisfactorily. The Japanese walnuts, which includes the heart nut, grow faster, at least the first two or three years, on stocks of their own species and these are probably to be preferred, but after the trees grafted or budded on black walnut stocks get well established they grow rapidly and, since the black walnut makes a deeper root system, heart nut trees grafted on this stock might be better, for some locations at least.

With the hickories, (carya) varieties of the various species and their hybrids seemingly are more particular as to stocks and the pecan is the one species of hickory that I have tried that all the other hickories do well on. As a general rule, however, I would prefer the varieties of each species of hickory worked on stocks of their own species, but the shagbark. We use the bitternut stocks for the shagbark-bitternut of their faster growth, they are easier to grow and graft than stocks of the shagbark. We use the bitternut stocks for the shagbark-bitternut hybrids and believe this is the best stock for these, although they do well on the pecan stock also.

Handling and Planting Seed Nuts

Seed for planting to grow stocks should be either planted in the fall or stratified in sand or light soil and planted the following spring. Stratifying is simply bedding in sand or light, sandy soil, using three or four parts sand to one part seed with a good layer of sand or light soil over the top to prevent the seed drying out.

With small lots of a few bushels or less, boxes with the bottoms removed and screen tacked on to prevent mice getting in, are splendid for his purpose. The boxes are set on top of the ground, the screen side down, and when filled another screen should be tacked over the top and the boxes banked with earth, when the seed will require no further attention until planting time. The seed should be planted before it begins to sprout. With the black walnut, bitternut, and the pecan this would be before April 20th, in southeastern Pennsylvania. The Japanese walnuts usually vegetate a little earlier or April 10th to 15th.

The land for planting seed nuts should be rich and well prepared as for planting garden vegetables. The usual nursery practice is to plant in rows $2\frac{1}{2}$ to $3\frac{1}{2}$ feet apart, dropping the nuts thickly but in a straight line, in narrow trenches about two inches deep. After the seed is planted it is covered with several inches of earth. After the seed is well sprouted and before the plants begin to come through, the ridge over the row is pulled down to the ground level. This leaves a light covering over the seed and leaves the surface soil mellow and clean over the row. The young plants must be well cultivated and kept free from weeds through the growing season.

Transplanting and Handling Seedling Stocks

The following spring, or when the seedlings are one year old,

they are transplanted to the nursery to grow on for budding or grafting stocks. Transplanting helps in making for better roots on the trees as well as spacing the trees the proper distance to grow up to "finished" nursery trees. Trenches for lining out the young seedling stocks can be opened up with a single shovel or a one horse cultivator, by removing all but the center standards and shovels and running two or more times to the row to get proper depth. We rarely cut back these small stocks when transplanting and they are more easily cultivated and cared for if the tops, or at least part of the tops, are left on. The plants must be given more room in what we might call the permanent nursery, and the usual practice is to set them in rows $3\frac{1}{2}$ to 4 feet wide and the plants 10 or 12 inches apart in the row. On rich land, the Japanese walnuts make good budding or grafting stocks the first year after transplanting, while the black walnut takes two years and the pecan and bitternut a year longer usually.

Size or Age of Stocks for Grafting or Budding

It does not pay to try to graft small stocks. It is more difficult to get buds or grafts to take on small stocks, and, if they do take, more time is required to make trees large enough to handle satisfactorily.

In nursery practice, to graft to the best advantage, the stocks of black walnut or other thick bark trees should caliper at least $\frac{1}{2}$ inch and up. Pecan and bitternut can be somewhat smaller. Of course most of the stocks at the ages mentioned will run larger than this as a rule, but if there are very many stocks below these sizes it may pay to let the block stand another year before grafting.

The beginner is quite likely to make the mistake of selecting out and grafting a few of the largest stocks in a block of seedling stocks the next year after transplanting, instead of waiting two years. As usually handled, this does not work out well in practice for the reason that the stocks not grafted over-top the young grafts and they run up spindling to reach the light and do not make good trees. This can be overcome very largely by cutting all stocks not grafted back to near the ground line. These will promptly throw out new shoots and one of these can be left for budding the same season or for grafting the following spring. These new shoots, growing up with the grafts, will not do them very much harm. Large stocks should not be cut back below where they are to be grafted, but small seedlings, when cut off near the ground,

will heal over quickly and will not be injured for stocks by cutting back and growing up again. On the contrary, this seems to make them more vigorous and, if they are to be budded, they handle better than stocks not cut back.

Budding and Grafting the Nut Trees

The technic of budding and grafting can not be described satisfactorily to properly instruct the beginner without the aid of special illustrations, and as Dr. Colby, when asking me to prepare this paper, insisted that I keep the beginner especially in mind, I shall not try to cover this phase of the work. We have a little booklet illustrating budding and grafting, however, and I shall be glad to mail a copy of this free to any one desiring it. Budding and grafting is covered more thoroughly, however, in the Government bulletins by Dr. C. A. Reed and in Dr. Morris's new book, "Nut Growing."

Selecting and Cutting Scions for Grafting

It is generally understood that in taking scions for grafting only the one year growth is considered. With most of the nut trees however, older scion wood, if not too large, can also be used to advantage, and with such trees as the pecan and shagbark hickory the older scion wood is to be preferred, as it gives better stands of grafts.

Scions of the black walnut, however, from growth older than one year, is of little or no value for grafting. To the contrary, scions of the English or Persian walnut from two year wood give excellent stands of grafts usually. Scions for grafting should be cut early before the sap gets active in the trees and should be selected from the best growth, that is, good, solid, wood growth with as little pith as possible. With a little experience, one will quickly detect poor scion wood without cutting into the growth by the color of the bark and the large, plump buds, set closer together.

Storing and Keeping Scions for Grafting

It is not in the selection of scions that the beginner usually fails to make his grafting a success, but in handling the scions. Scions for grafting need not be put in cold storage. In fact cold storage, at the usual temperatures, seems to be injurious to scions. Cool storage, that is, temperatures maintained below the freezing point, is O. K. but in my experience this also is not necessary. We store them in a cellar with a ground floor. This is damp and cool and the cases the scions are stored in are without bottoms and set on the damp cellar floor. The

cases are lined with tar paper or light roofing, both the sides and the lid. The latter is hinged for ease in getting out scions as needed. No packing is used around the scions and they draw enough moisture from the damp ground below to hold them plump and in good condition. Good scions, stored in this way, can be kept for weeks or even months, if need be, in excellent condition. People often write me asking why it is they can graft nut trees and secure good stands with scions secured from me while they fail with their own scions. The trouble is, usually, that they have packed their scions too damp and they have absorbed too much moisture. Nut scions for grafting are soon spoiled if packed too damp, even if kept at temperatures considerably below that required to cause the sap to flow in trees outside. In judging whether scion wood is too sappy to use, our rule is, if the bark peels off easily they are too sappy. This, however, does not always hold good in practice. Black walnut scions, especially, will sometimes give good results after they have reached this condition, but they must be used promptly.

Controlling the Sap in Stocks to be Grafted

In the beginning in the propagation of northern nut trees in Pennsylvania, we found results much more uncertain than in the lower south and, while good stands of grafts were sometimes secured and we would feel that we had "turned the trick", the next season blocks of stocks grafted under seemingly the same conditions often gave poor stands of grafts. Closer observation and tests showed that those stocks that bled (ran sap) even moderately when cut back for grafting, were generally failures. Also, that in those stocks that bled freely the reaction was much slower, due to the devitalizing effect of the bleeding, and they calloused slowly if at all. Grafts set on such stocks are pushed quickly into activity and, if they are not injured by the souring of the sap from the stock, they start callousing quickly and considerably ahead of the stock, and are caught at the critical time on a dry, inactive stock and a union is impossible.

We overcome this by cutting the stocks back a week or ten days ahead of grafting. They are cut off at the point we wish to graft them, which is usually 4 to 6 inches above the ground line, the cleft to receive the graft being cut in the stub without recutting. If the stubs are cut again for grafting the cut must be very light, otherwise the stock will probably bleed again, and is very stubborn to handle.

Sometimes it is advisable to go over a block of stocks twice, leaving those stocks that may be still bleeding a few days longer.

We also found that by cutting the stocks back ahead of grafting we would safely begin grafting considerably earlier and this is quite an advantage where one has much grafting to do. Handled in this way, we have been able to get fairly uniform and good stands of grafts every year, and have the past ten years, so we feel rather safe in saying that we have the matter of propagation on a safe basis and that nut trees of most species at least can be propagated as safely as our more common fruit trees, although the cost of growing the nut trees is, of course, considerably more.

I have not mentioned budding the nut trees. As a matter of fact we now do little budding, but we did considerable budding before we had the matter of controlling the sap in the stocks worked out satisfactorily, as it was safer to rely on. We still bud the heart nut trees, however, as they are more difficult to graft successfully and we cannot rely on grafting for a supply of these trees.

Care of the Grafts and Young Trees in the Nursery

Grafts will not start uniformly, although a large percentage should start growth within three or four weeks, after the grafts are set. The beginning is sometimes puzzled therefore to know how to handle tardy grafts. Continued sprouting of the stock to force the graft into growth will injure the stock if continued too long. On such we allow one shoot to grow from the stock below the graft, leaving this preferably on the south side to get the benefit of the shade. If the graft fails to start within a reasonable time yet is still alive, this shoot may be pinched back, leaving a few leaves to take up some of the sap and prevent too much deterioration in the stock. After the graft is well started this shoot can be removed. To play safe against storms and to insure the young trees making up well, they should be staked. We use stakes sawed out of cypress or other good lasting wood. Seven eighths or three fourths inch lumber is ripped into strips $1\frac{1}{2}$ or $1\frac{1}{4}$ inches wide and cut into the lengths desired, usually 4 to 5 feet long. Buds or grafts, when set on good strong stocks, make trees large enough to plant in the permanent orchard in one year, and most of the trees we sell are only one year from the bud or graft.

I have not mentioned what is commonly called "Top Working" seedling trees. This is simply budding or grafting over the tops of larger trees, usually on the limbs or branches, and trees growing where they can be left to bear. This, too, is fully covered in Dr. Reed's bulletins and in Dr. Morris's book, "Nut Growing".

NORTHERN NUT GROWERS' PRIZE NUT CONTEST

By Dr. W. C. Deming, Hartford, Conn.

The 1926-27 prize nut contest of the Northern Nut Growers Association, for the first time limited to one nut, the black walnut, was probably the greatest nut contest ever held in the history of the world. Its great success in bringing in the nuts is due to the publicity given it by the ingenuity of Dr. J. Russell Smith.

The Plan Pursued

The procedure that was developed as the correspondence and packages began to come in, early in November was as follows. About half of the packages were preceded by letters either announcing their sending or asking how it should be done. Each one of latter was answered immediately with a printed circular, accompanied by the circular of the association recommending the planting of black walnuts, and a third circular describing the objects of the association and the advantages of joining it. In addition notes were often added in answer to special questions. All the letters were then marked at the top in red pencil with the name of the sender and filed in alphabetical order. This involved considerable labor in the verification of names and addresses as many were very illiterately written.

As the packages came in they were allowed to accumulate as it was found, after examining a few, that many were too green for proper testing and a period of drying and curing was necessary. The accumulation soon became alarming. The occupants of a small apartment were nearly driven from home. When the testing finally began in earnest the packages were opened, names and addresses again verified, and the statements in the letters noted. Several nuts were then cracked with a special cracker and those manifestly of no value were discarded. Those worthy of further consideration were put in bags properly labelled. In all cases, whether the nuts were of value or not, a notation was made on the sender's letter of their characteristics and also on a printed postal card which was returned to the sender in acknowledgment, and often some special notation was made. A copy of this card is here shown. The letters of the nuts examined were then put into a separate file.

983 Main St., Hartford, Conn., Date.....

The nuts that you send for the prize contest of The Northern Nut Growers Association, I estimate as follows:

No.
Size—small, average, large, very large.
Shell—thin, average, thick.
Cracking—poor, average, good.
Kernel—light, dark, brown, plump, shrunken.
Quality—poor, average, good, rich.
Good for home use.
Will receive further consideration.

The nuts deemed worthy of further consideration were divided into first and second choice. When all the nuts had been examined those of first choice were gone over again and final selection made for submitting to the committee of award. This final selection was taken to the office of Dr. Smith in New York where the committee, composed of Dr. Smith, Dr. Morris, Mr. Bixby, Mr. Reed, Mr. Jones and Dr. Deming did its best to still further reduce the number of selected specimens. This final selection was then referred to Mr. Bixby for critical tests.

Notes and Incidents

The nuts were packed in every imaginable sort of container. Many were sent in bags and this is the most satisfactory container for hard shelled nuts. Many were so poorly packed that the nuts rattled out as they were delivered and it was only by the grace of the post-office employees, who soon came to know the destination of packages of black walnuts, that they were ever delivered. The names and addresses were lost, or not given, for some packages and a number must have been lost altogether, judging by the number of letters announcing the sending of nuts that were never received. The prize package of all was a casket of heavy, polished black walnut wood put together with embossed screws and with a copper name plate on the cover engraved with the name of the sender. This sender was an undertaker.

The number of packages in which each nut was wrapped separately in tissue paper was astonishing. It was also somewhat boring to have to unwrap each nut. One man sent two unwrapped bundles of what I suppose he considered scions, and no nuts. A number sent unprotected bunches of scions in the packages. One package of scions was received in good condition. Many packages were insured, several sent

by special delivery and one even by air mail. Several were marked fragile though there is hardly any natural object less fragile than most of the black walnuts received.

One man sent 19 different varieties each neatly packed in a bag and not one of value. Another sent 16 varieties of the same valueless nature. Another 7 varieties all false or shrunken. Many sent the nuts in the husk and some of these were a festering, mouldering mess when opened. The apartment was filled with fruit flies from one of these packages.

One man would send me nuts "if assured of the prize." Several asked me to send postage and one from the South sent a heavy box "express, collect," while one man in the Middle West wanted the association to send an investigator to see his tree.

Sources by Sections

The South sent by far the larger number of nuts, Tennessee leading, but very few of these were found worthy of consideration, being usually thick shelled and poor crackers with dark kernels. On the other hand the nuts from Virginia and from the Middle West were usually thin shelled and good crackers with light kernels.

In New England the black walnut is hardly known as a nut for eating. Most people do not even know it when they see it. This probably accounts also for the small number of nuts sent from New York and New Jersey, although there must be a great number of trees in those states. But in the South the black walnut is so esteemed that many of the trees are regarded with pride and affection by the owners. Many of the letters were almost pathetic in the love expressed by the writers for their trees. The sale of kernels furnishes many families with cash for the outfitting of the children for school. Great size of the nut is a chief source of pride in many of the nut senders, although the nuts themselves usually turned out quite worthless for the purposes of this competition. The most extraordinary claims were made for the nuts and usually the sender's opinion of their value was quite worthless. Many seemed quite sure that the first prize would be awarded them as soon as the nut was received. "Grandfather planted it when I was a little girl" was often considered reason enough for deserving a prize.

Women seem particularly interested in nut trees. The gathering

and cracking of the nuts, the disposal of the kernels and the profits therefrom seem to be considered, especially in the South, as woman's province.

It is the intention of the committee in charge of this competition to publish not only the names of the prize winners and those deserving honorable mention, but also the names of all those who sent in nuts worthy of serious consideration. This will make a very long list but it is believed that it will be of great value to make known the location of these valuable trees scattered over so large an area of the country. Many inquiries can thus be referred to good trees not many miles distant from their homes that are known to be adapted to their own localities. This may turn out to be very important because it is not yet known that the very best varieties will be equally successful when moved far from their native adaptations.

The final critical tests of the nuts selected by the committee were made by Willard G. Bixby, Baldwin, N. Y., at the request of the committee, and the prizes were awarded on the basis of these tests. Mr. Bixby's detailed report follows.

It would not be fitting to neglect this opportunity of calling attention to the good fortune of the association, and of the nut growing industry, in having in Mr. Bixby a man of the means, ability, patience and willingness to conduct so exhaustive a series of scientific tests in determining the relative values of so many nuts. Such work is of permanent value to the whole world.

Scions have been received from all, or nearly all, of the prize winners, have been distributed to experienced propagators, and have been successfully grafted.

Letters were received from 1209 persons from 36 states, the District of Columbia and Canada. Some of them wrote several times. No letters were received from Maine, New Hampshire, Vermont, Colorado, Utah, Nevada, Wyoming, Idaho, Oregon, Montana and the Dakotas.

From a literary, sociological, and other points of view not directly relating to the contest, these letters are interesting and would repay further study. Unusual words, like "boskage" for thicket or woods, "goodies" for kernels, and "poak" for bag, go back to the time of

Spencer and Chaucer. There were appeals to the sympathies, hoping for the first prize to "help build the church," or to "pay for my boy's operation." Taking into the family confidences was common. A confiding friendship was the rule, specially from the southern people.

The number of packages of nuts received was 930, containing specimens from 1229 black walnut trees and 115 other nut trees, a total of 1344 specimens. Of the walnuts, other than the eastern black, there were ten specimens of butternuts, five of the California black walnut, five siebolds, four Persians, three heart nuts, two hybrids, and one sinensis.

Of the hickories there were 38 shagbarks, 24 shellbarks, 13 pecans, 4 pignuts, 2 mockernuts, one probably a buckleyi, and one hybrid. There were two filberts, some post oak acorns and one package of prunes. All of the packages received have been tabulated by states.

The number of persons who wrote that they had sent, or were sending, specimens, but of which I have no record of receipt, was 28. Several came without name or address of sender but all of these were identified, in some way or other except four. Deducting these four from the 28 leaves 24 reported sent but not received. Some of these may never have been sent, some may have been faults in my records, but most of them probably were lost in the mail. Many packages were received in such bad condition that I got them only by the grace of the postman. Sometimes the nuts were half gone and one package was entirely empty. Now and then a package may have failed to pass through the hands of somebody very fond of black walnuts. Twenty-three per cent of these failures were women and 20 per cent men.

The number of persons who wrote letters of inquiry about the contest, but of the receipt of nuts from whom I have no record, was 253. This is to me an extraordinary and almost inexplicable thing. I sent every one of these correspondents the contest circular, also bulletin No. 6 and the circular of the association. Why such a large number of persons should have the interest to write letters of inquiry, and then fail to send nuts, is almost beyond my comprehension. Of course there were a number who only wanted to sell nuts or kernels or young trees or trees for timber. But there remains a large number of correspondents who did not respond to our invitation to send nuts. It almost

seems as if there might have been something lacking in the form of our invitation.

Some light is thrown on this problem when we consider by states the percentage of correspondents who failed to send nuts. It was much greater in the southern states. For instance out of 119 writers from Tennessee 59, or almost exactly 50% failed to send nuts. Whereas out of 133 writers from Ohio only 11%, out of 123 from Illinois only 10%, and out of 22 writers from Iowa only 4½%, failed. This held good for the other states. In a general way the farther south the larger the percentage of failure. Georgia 40%, Alabama, 35%, Mississippi 33%, Kentucky 29%, Arkansas 25%, Virginia 23%, Pennsylvania 20%, W. Virginia, 19%, Missouri 16%, South Carolina 14%, Indiana 13%, Michigan 7%, Maryland 6%.

Of the 1209 writers 460, or 38% were women. There was a slight preponderance of women writers from the southern states.

Of the 1229 black walnut specimens received 253, or 20%, were set aside for further consideration. These 253 were further reduced to 87 and submitted to the judging committee which reduced them to 40. The 40 were tested by Mr. Bixby's methods and prizes were awarded to 23, a little less than 2% of the total number received. It was a difficult matter to reach this conclusion and there can be no doubt that a number of nuts with valuable characteristics received no prize. I should say that nearly all the nuts reserved for consideration, viz. 253, deserve honorable mention and a list of them should be published.

All the nuts that were given consideration in the preliminary inspection, but not judged important enough to be submitted to the judging committee, as well as those submitted to this committee but rejected by them, were turned over to the Dept. of Agriculture at Washington. I am informed that these have been examined there and that several of them are to be experimentally propagated by the Department.

Ohio took 6 prizes, Illinois and Iowa 4 each, Kentucky 3, Virginia and Indiana 2 each, North Carolina and Pennsylvania 1 each.

Iowa was far ahead in the percentage of nut receiving consideration, by my standards, and the percentage of prizes won although the

number of specimens sent was small. Of 27 specimens from Iowa 16, or 59%, received consideration and 4, or 15%, prizes. Of 162 specimens from Ohio 45, or 28%, had consideration, and 6, or 3.7% took prizes. Of 157 specimens from Illinois 30, or 19%, had consideration and 4, or 2.5%, took prizes. Similar figures for the other prize winning states are: Indiana, 96 specimens, 22, or 23% consideration and 2, or 2% prizes. North Carolina, 81 specimens, 13, or 16% consideration and 1, or 1.2% prizes. Virginia, 97 specimens, 20, or 20% consideration and 2, or 2% prizes. Kentucky 60 specimens, 11, or 18% consideration and 3, or 5% prizes. Pennsylvania, 74 specimens, 14, or 19% consideration, 1, or 1.3% prizes.

The noteworthy fact is the marked preeminence of Iowa in the percentage of nuts getting consideration and winning prizes according to our standards. Kentucky, Ohio, Illinois, Indiana and Virginia, Pennsylvania and North Carolina followed in that order in percentage of prizes won. Tennessee, Missouri, Mississippi, Alabama, Maryland, Georgia, West Virginia and South Carolina, although sending many specimens, won no prizes. Delaware sent only 3 specimens. Mr. Bixby thinks that the work of Mr. Snyder and Dr. Dennis has educated the people of Iowa to know good nuts.

For future contests we should determine some simple tests of merit that can be quickly applied for the preliminary elimination, for, of course, Mr. Bixby's time consuming scientific tests and mathematical calculations are out of the question, except for a small number of final selections. I ask the suggestions of the convention as to what these preliminary tests should be. Those that I had in mind and used were as follows:

It has become evident that black walnuts are to be judged on their merits for cracking by machinery. Therefore *form* and *color* of nut are of little importance.

Size. Nuts can hardly be too large if there is little sacrifice of proportion of kernel. Great size of nut may sometimes go with lack of tree productiveness, but one can tell very little about productiveness in judging nuts sent to a contest. Statements of contestants in regard to this all important character are probably of little value. On the other hand nuts much below medium size are usually undesirable

as entailing too much labor in handling. There may be occasional exceptions to this rule, as in the case of the peanut walnuts.

Husking. I counted it against a nut if it had much, and especially a powdery, husk adhering. Perhaps I became unduly prejudiced from the many violent attacks of sneezing that I got from inhaling this sternutatory dust. Also it was impossible to keep the dust from soiling the kernels and making them very unattractive. If husks can be readily removed by machinery then this fault is not one of much consequence, from a commercial point of view.

Thickness of shell, if not at much sacrifice of proportion of kernel, will not be a serious fault when nuts are cracked by machinery. Other things being equal, however, the thinner shell the better. I think that I attached too much importance to thickness of shell in my preliminary examination.

Cracking quality. This I considered of paramount importance, or rather of equal importance with the factor of good kernel. We must have a good kernel and we must be able to get it out fairly easily in large pieces. Large, thick-shelled nuts are not necessarily poor crackers. Small, thick-shelled nuts usually are. Thin-shelled nuts are not necessarily, but usually are, good crackers. Of course the single kernelled nuts, like the Stabler imperfect form, are the best crackers. We have several of this type, or of the peanut type, and everything possible should be done to develop them on account of this very great merit. Many nuts are excellent crackers with a machine that would give no indication of it when cracked by the hammer. In fact the introduction of the cracking machine has made it possible to crack the average run of black walnuts very satisfactorily, and its use should be encouraged in order to make available the nuts now produced in abundance by native trees. The cracking machine has possibly made less urgent the need for improved varieties.

Nuts in which the kernel is slightly shrunken, like those with a hard, sweet kernel, are often almost perfect crackers. The very full, oily, tender, rich kernels are sometimes hard to extract even when the shell cracks well, and these kernels often shatter badly, which I judged to be a rather serious defect. Perhaps a little longer curing would make these very desirable kernels less likely to shatter.

At first I tried cracking with a hammer in different ways and with various accessory devices. I soon found that the labor was too great and the results unsatisfactory. The commercial development of the black walnut must be considered in connection with machine cracking. After breaking two early models of the Clark Nut Buster I found the third model entirely satisfactory. I am satisfied that this works on the right principle of bursting the nut by pressure exerted through its bipolar axis, with hollowed anvil and plunger, instead of crushing it or splitting it in halves or quarters, as with a hammer.

Color of Kernel. This resides in the pellicle. The flesh of all black walnuts, properly cured, is white, or creamy white, beneath the pellicle, I believe. Kernels may be blanched as almonds are blanched, and are very attractive. A few nuts appear to be quite, or almost, self blanching, the pellicle adhering to the shell or being easily rubbed off. Apparently, also, freezing loosens the pellicle but also damages the appearance and quality of the flesh, giving it a water cored look and a tough and impaired quality.

Generally speaking the very light, almost white, kernels are much more attractive and of better and milder quality, although some of the nuts, especially those from the south, have a rich, brown color and very high quality. But color and quality seem to depend a good deal on the proper curing of the nut. This was recognized by many correspondents who apologized for the neglect. Nuts not cured and hulled promptly have the color and quality of the kernels markedly impaired. Future commercial development of the black walnut must take its proper curing very much into account.

Quality and Flavor. These depend, as already said, much on the curing. The strong taste, that so many object to, depends, partly at least on this. The kernel of a properly cured black walnut is a thing that one gets fond of and I often ate more than I needed when I was cracking some of the good ones. I found that some of my friends, previously unacquainted with the nut, rapidly developed appreciation, and increased demand, for the kernels. Richness and tenderness depend on the proportion of fixed oil, and I think that flavor is also bound up with this. If flavor depends on a volatile oil held in the fixed oil it may be that a determination of the percentage of fixed oil will be found to be a fairly accurate way of determining the quality of a nut.

There are two distinct types of black walnut, as regards quality of kernel, just as there are for the Persian walnut, as shown by Howard Spence of England. These two types merge into one another. At one extreme is the rich, oily, tender kernel, at the other the dry, tough, sweet kernel. The sweet type appears to be much more common in nuts grown in northern regions, to be due to deficiency of oil, probably due to lack of heat or shortness of growing season, perhaps varying from year to year. Some of the sweet nuts are fairly good and, I think, always lack the strong black walnut flavor.

Nuts a year old, or older, generally have a slightly rancid or a soapy taste. There is probably a difference in different nuts in regard to keeping quality, perhaps depending partly on the curing.

As said before I hope that members and others will express their opinions as to the relative importance of the various factors that I have mentioned, and any others, in the preliminary, and in the final, judging of black walnuts.

The very important factors of productiveness, vigor of tree, climatic and soil adaptation and self fertility or self sterility, we can tell very little about until time has given us opportunity for observation and testing.

Dr. Morris will be glad to learn that one boy wrote that he was a Scout and one girl that she was a Camp Fire Girl. Unfortunately neither of them took a prize. Apparently very few boys or girls were contestants, only 11 boys and two girls who gave their ages. Perhaps some of the others were in the same class but did not say so.

The smallest nut, not much larger than a good sized filbert, came from Winnebago, Minnesota. I think it was this one that I judged to be small enough, thin-shelled enough, and good enough, to crack at table with a small cracker. The largest nut came from Charlotte, N. C. One from Texas and another from Arkansas had the thickest shells and the thinnest shelled nut came from Ohio and won a prize. The largest, thin-shelled nut came from Springfield, Illinois, and the nut with the largest kernel came from Goodlettsville, Tennessee. The worst nut came from Deport, Texas

Five or more sent three cornered, three lobed nuts, some saying that

all of the nuts on the tree, others that half of them, were of this type. This appears to be a disadvantage rather than an advantage. Two specimens of square nuts were received, but apparently they had two lobed kernels. They were of no special value.

Mrs. Luey Pierce of Batavia, Ohio, sent nuts of the Stabler type with the statement that about half the nuts are one lobed. This nut was not considered for a prize as all of the kernels were shriveled in the nuts of that season. Those of the previous season were well filled. This tree should be further observed. Mr. Weber has visited it and can tell us more about it.

Ralph Throp of Greensburg, Indiana, won 3rd prize with a peanut type of nut and writes that all the nuts on the tree are of this type. They were nuts of the previous season and somewhat spoiled.

These two nuts, and the first reported peanut walnut, come from the same territory within 150 miles of one another, between latitudes 39′ and 39′ 30″. The Stabler comes from Maryland in about the same latitude. Search in their neighborhood might be rewarded by finding others of this interesting and valuable type.

From Louisville, Tenn., came some kernels one of which had apparently been taken from a nut with one lobe.

One man reported that his trees are dwarfs.

One woman reported that her tree forks 2 feet from the ground and the two halves bear different nuts. Those that she sent were different. She says that the tree is not grafted.

Two senders report that their seedling trees bears at three years of age.

Two growers report that their trees bear fifty bushels each.

One man reports that the seed of the parent of his tree was brought from Africa.

A woman in Darlington, S. C., sent a large, round, thin-shelled, rather poorly filled nut which she thinks is a hybrid of the pecan and the Japanese walnut. It appears to be a pure pecan.

Several foresters and county agents sent nuts or wrote of interest in the the contest.

One lady asked for the first prize just for telling us that the way to crack black walnuts is to hit them on the end with a hammer.

One man reports a lot of Royal walnut seedlings.

Another man sent hulls only, to let us know what big walnuts he has.

A large proportion of senders said that the nuts were not as large as usual on account of the weather being too dry, or too wet or the trees being over-loaded. This shows the same human attribute that makes our hostess affirm that she "didn't have good luck with her biscuits this time."

Many reported their trees as annual bears, some as alternating light and heavy crops, some as bearing only every other year.

The number of those who sent nuts all, or most, of which were either hopelessly spoiled or entirely false was surprisingly large. Some of these were explained by the kernels spoiling or completely shrinking after being sent. One specimen set aside for consideration was shrunken to worthlessness on later examination.

A few correspondents showed an intelligent interest in nut culture, but most of them were simply after a prize.

Several senders mentioned the fondness of hogs for the walnuts.

The names of some of the towns arrested the attention. Names like Birdseye, Weeping Water, Spirit Lake, Broken Bow, Flowery Branch, Pizarro, Echeconnee, Red Bird, Sleepy Eye, Mouth of Wilson and Laurel Bloomery must have stories.

But when it comes to names of people lo, Davis led all the rest, and there were fourteen of them.

Several persons sent specimens of nuts already being propagated, such as Stabler and Thomas, but did not say anything about it.

Six nuts, black walnuts and hickory nuts, that took prizes at the Buck's County fair, were sent in but were not considered worthy of consideration.

When the packages of nuts were piling in and almost swamping my limited quarters it seemed as if we must be getting a comprehensive representation from all the trees in the United States. But when one considers that I got only one nut from Connecticut, although there are probably 200 trees in the City of Hartford alone, and thousands in the state, and that it is a poor state for black walnuts, and if the same proportion holds good for the black walnut states of the south and west, one realizes what an inconsiderable representation of the millions of trees of the country the contest brought out.

Such contests should be many times repeated for black walnuts and other nuts, if we are to find many of the best ones, but they mean a great deal of work.

Dr. Morris says that the shagbark hickory was the only kind of nut that brought forth expressions of tenderness of feeling. But many simple southern people love their black walnut trees. They refer to them with tenderness. As, for instance, "the tree that mother brought from the old place and always took care of", or, "the tree that grandfather planted the year that Lincoln was assassinated", or, "the tree that we always sell enough kernels from to pay for the childrens' school outfit."

How to dispose of the rejected nuts was a problem. I gave some to the janitor, sent as many as they would take to the Crippled Childrens' Home. Most of the local stores had no use for them but I finally found one grocer, who makes something of a specialty of nuts, who took over twenty bushels, some at four and some at five cents a pound. He told me that he could sell them only to southerners, westerners and negroes who were familiar with them. New Englanders generally hardly know what the nuts are, although the tree is fairly common as a shade tree in Southern New England. They are seldom gathered except by the squirrels, and the nuts are often small. However I know trees in Connecticut that bear large nuts, the biggest black walnut tree I ever saw is near South Norwalk, and the biggest crop I ever saw was on a tree in a lane near my former home. There are trees bearing fair nuts since I was a small boy in Litchfield near the N. W. corner of the state. But there is a very small demand for black walnut kernels in New England, according to my experience. New England needs education, in this at least.

One old lady said that nuts were like people, no two alike, an apt expression of truths.

Correspondents reported the following sources of information about the contest:

So. Agric., 145; Farm Journal, 60; Progressive Farmer, 42; Ohio Farmer, 39; Farm Life, 33; Prairie Farmer, 26; Youth's Companion, 25; Pa. Farmer, 16; Farmers' Guide, 18; Farmers' Home Jour., 14; Successful Farming, 9; Fruit Grower, 11; Nat. Farmer and Stockman, 12; Md. Farmer, 6; Orange Judd Farmer, 4; Am. Nut. Jour., 2.

Bull. C. & O. & Hocking Val. R. R., and the following were each reported once: Ill. Central Mag., Delta Herald, Wabash News, Aurora Beacon News, News and Observer, Baltimore Sun, Ashville Citizen, Galax Post-Herald, Kablegram, Ashland Independent, Clarion Democrat, Am. Agric., Des Moines Register, Coshocton Tribune, Home Life, Club Bulletin, Williamsport Sun, Rock Co. News, So. Ruralist, Ill. St. Hort. Bull., Pacific Rural Press, Brazil Times.

MR. BIXBY'S REPORT

I present herewith the report of my examination of the forty nuts which the judges had left after eliminating over half of the ones brought to Dr. J. Russell Smith's office on March 3d, 1927, and which it was agreed I should test by the methods used in previous contests, using however, a new score card embodying each quality, and the value to be assigned to each, as our present knowledge of the black walnut would indicate to be as correct as is now possible.

The methods used in previous contests are described in the Report of the Tenth Annual Meeting of the Northern Nut Growers Association, page 122. The score card there is noted as below:

General Values		
Weight	10	Points
Form	5	"
Color	5	"
Shell Values		
Husking quality	5	"
Thinness	10	"
Cracking quality	20	"
Kernel Values		
Color	5	"
Proportion of kernel	20	"
Quality and flavor	20	"
Total	100	

This was shortly after changed by taking five points from proportion of kernel, leaving it fifteen, adding five points to cracking quality, and distinguishing between cracking quality commercial, the per cent of the entire kernel that could be easily picked out after cracking, which was given twenty points, and cracking quality absolute, the per cent of the entire kernel that dropped out after cracking, to which five points were assigned.

The above score card was intended to be used for all nuts with a hard shell and has seemed quite satisfactory up to the present time.

For black walnuts, however, especially for use in the 1926 contest changes seemed desirable, as it is evident that black walnut kernels, and not the entire nut will be what will generally reach the consumer. The form and color of the shell did not seem important. Husking quality, the ease with which the husk is removed, while of the utmost practical importance, as those whose trees bore well the past season found with a vengeance, is impossible of determination when nuts are received husked and dried as they are in a nut contest. Thinness of shell did not seem to have much importance in the case of the black walnut, as in cracking nuts by machinery a thick shell means only added strength and power to the cracking machine. Eliminating these qualities from consideration gave us twenty-five points to add to others. The score card as finally adopted for use with black walnuts in the 1926 Contest was as follows:

Size	10	Points
Cracking Quality (Commercial 25) (Absolute 20)	45	"
Color of kernel	5	"
Proportion of kernel	15	"
Quality and flavor of kernel	25	"
Total	100	

The results of the tests are noted on the accompanying sheets. Unfortunately, it was not possible to write a line long enough on the typewriter used to get all the facts about each nut in one table. Therefore, two tables were made, the name and address of the sender of the nuts, and the points awarded, being on one, and the name of the sender and the weighings and calculations on the other. The column on the extreme right of the one showing the points awarded shows how each nut ranked in the contest, there being in many cases two or more nuts win-

ning the same number of points. There are also shown similar reports on the three principal propagated varieties, the Stabler, Ohio and Thomas. It is to be regretted that nuts of the Ten Eyck and McCoy were not at hand for similar testing.

There are also noted the nuts which are best in the various characteristics, even though the total number of points awarded them did not bring them among the winners. The tables for using the score card is also given in detail showing how from the five weighings and three calculations the number of points to be awarded was determined.

The nuts were cracked on the side between two flat surfaces as heretofore. Noting how well the cracker at the meeting March 3d, 1927, seemed to work, I rigged up steel tubes so as to bring pressure on the long way of the nut in the same way as in cracking with that machine. As Stabler nuts were the only ones I had in sufficient quantities to work on, I used these in testing out the effect of using tubes of various diameters. Three-fourths inch in diameter seemed the best for the Stabler. The average cracking quality commercial of the one lobe type cracked in his way was 100% and cracking quality absolute 52.0% just the same as when cracked on end between two flat surfaces. The figures for perfect form Stablers were 80% for cracking quality commercial and 0.0% for cracking quality absolute, very similar to the same nut cracked flat surfaces on the side, where the figures were 84.0% commercial and 0.0% absolute. While I would not want to conclude from these few experiments on one variety that there is no advantage in cracking black walnuts on end between hollow, pressure-producing ends, I believe that no serious error has been introduced into the 1926 contest because the nuts were rated on cracking on the side between flat surfaces.

The figures set down for quality and flavor of the kernel of course represent my opinion but it was carefully checked with those of Dr. Deming, as noted on the letters, and those of Dr. Morris, Dr. Smith and Mr. Reed as noted on the tags. Where there was a difference the nuts were gone over again and in many instances the figures changed. It was noticed that my estimation of highest quality corresponded quite closely to Dr. Deming's notation of "mild," while those he noted as "rich" I had set at 22. The nut which the others had estimated highly, and which I could not put among the winners, was the Fritz (28).

This nut although awarded the highest for quality and flavor, and within one point for color of kernel, failed to win because of small size, low cracking quality and small proportion (%) of kernel. I tried cracking one nut between tubes but while it showed a little better yet it was not very much better. I did not have enough nuts to make any extensive study of cracking methods with this variety.

I did notice that when cracked on end with the tubes, the kernel generally came out in larger pieces than when cracked on the side between flat surfaces, so I believe cracking on end between tubes or between parts with hollow ends will be the way black walnuts are cracked commercially. If this is the fact nuts for judging in the contests should be cracked the same way although from the evidence we have so far there would not seem to be very much difference in figures for nut contests between cracking black walnuts in this way and cracking on the side between flat surfaces as heretofore.

I consider the contest a most successful one both from the number of nuts received, above 1200 and from the fact that there were seventeen nuts that ranked with those now being propagated, one being better than the best we have.

The tests on the propagated varieties which gave sixty points for the Stabler, fifty-two for the Ohio and fifty-one for the Thomas would lead me to think it would be well to propagate experimentally all the nuts, ranking as high as the Thomas or higher. I would propagate experimentally also the following which have outstanding characteristics.

Vandersloot (25) .....Largest
Myers (22) .....Thinnest shell
Thomas (36) .....Whitest kernel
Adams (18) .....Large proportion of kernel
Kelling (30) .....Large proportion of kernel
Ogden (21) .....Easiest removed pellicle

These six latter would seemingly be valuable for breeding purposes. This would make twenty-three nuts from this contest added to the black walnut varieties we have. This is too many, of course, but I do not believe that we should attempt to determine too much from what we can learn from a contest; from now on more and more of our knowledge must come from the test orchard, and we cannot get this in-

formation unless we have promising varieties propagated enough to get in test orchards.

The printed material regarding the prizes calls for nine, one for $50.00 if a nut is better than those we have now, one of $15.00, one for $10.00, one for $5.00 and five for $3.00, total $95.00. As we have two nuts ranking third I would award two third prizes and $3.00 for each that we propagate experimentally. This would take $49.00 more for prizes than we have advertised; but I would undertake to raise this if the funds of the association do not permit its being spent, which I presume they do not. We would get scions much more easily from those to whom we awarded prizes than from those to whom we do not and we probably would have to buy the scions we want from those to whom we have not awarded prizes, and this very likely would cost us as much or more than the prizes.

BLACK WALNUTS

1926 Contest	Size	Crack Qual.	Col. Kern.	% of Kern.	Qual., Flav., Kern.	Total Points	No. of Prize
	10	45	5	15	25	100	
H. V. Stambaugh, Browning, Ill. (1)	5	19	4	10	25	63	1
John Rohwer, Grundy Center, Ia. (2)	4	18	4	9	25	60	2
C. D. Asbury, Augusta, Ky., (3)	8	15	3	8	25	59	3
Ralph Throp (1 lobe type), Greensburg, Ind., R. 8 (4)	2	38	3	1	15	59	3
J. W. Hopwood, Athens, Ill. (5)	5	19	4	5	25	58	4
Ballard Robinette, Colburn, Va. (6)	7	17	3	5	25	57	5
C. E. Mark, Washington, C. H., Ohio (7	3	22	3	6	22	56	6
Herbert Burton, Hartford, Ky. .8)	7	15	3	5	25	55	7
Mrs. William Patterson, Wever, Ia. (9)	3	13	3	11	25	55	7
W. F. Stout, Hamersville, O. (10)	2	16	3	11	22	54	8
B. J. Tilley, Murfreesboro, N. C. (11)	9	9	3	7	25	53	8
Frank H. Hare, Rushville, Schuyler Co., Ill. (12)	4	15	4	8	22	53	9
J. J. Knapke, New Weston, O. (13)	4	14	4	9	22	53	9
C. T. S. Hobbs, Ft. Blackmore, Va. R. 1 (14)	6	13	3	8	22	52	10
Will L. Schimmoller, Ft. Jennings, O. (15)	2	12	3	10	25	52	10
Mrs. Geo. I. Bontz, Peoria, Ill., R. 2 (16)	3	17	3	8	20	51	11
J. W. Warehine, Quaker City, O. (Sweet type) (17)	2	15	3	9	22	51	11
Gerald W. Adams, (Ohio type) Horsehead, Ia. (18)	4	6	2	13	25	50	12
Meyers Bros., Brookville, Md. (19)	6	11	3	7	22	49	13
Amelia Riehl, Godfrey, Ill. (20)	4	13	3	4	25	49	13
Mrs. Joe Ogden, Bedford, Ky. (21)	5	8	3	7	25	48	14
Elmer R. Myers, Bellefontaine, O. R. No. 2 (22)	0	25	3	11	10	48	14
R. W. Powers, Auburn, W. Va., R. No. 2(23)	7	10	3	6	22	48	14
Miss Florence Shireman, Allenwood, Union Co. Pa., (24)	2	12	3	6	25	48	14
C. E. Vandersloot, Muddy Creek Forks, Pa. (25)	10	10	2	4	22	48	14
David Schock, Monticello, Ind. (26)	4	6	4	8	25	47	15
S. W. Snyder, (Pearl) Center Point, Ia. (27)	5	12	3	7	20	47	15
I. E. Fritz, 989 River St., Elyria, O. (28)	1	7	4	9	25	46	16
Mrs. Horace Witty, Pleasant Plains, Ill. (29)	7	9	3	5	22	46	16
W. Kelling (Thomas type) Davenport, Ia., R. No. 5 (30)	4	7	2	12	20	45	17
James J. Weatherby, Blackwater, Va. (31)	2	13	2	6	22	45	17
J. B. Drake, Ray, O. (32)	3	10	3	6	22	44	18
J. C. Lucas, Advance, Ind. (33)	3	7	3	9	22	44	18
Mrs. W. M. Morton, Brevard, N. C. (34)	4	66	4	4	25	43	19
Robert L. Atkins, New Albany, Ind., R. No. 3, (35)	3	11	4	9	25	42	20
John Muriel Thomas, Henryville, Ind. (36)	2	2	5	8	25	42	20
Lillian E. Morton, Independence, Va., R. No. 5 (37)	4	11	2	4	20	41	21
W. R. Creitz, Cambridge City, Ind. (38)	2	7	3	8	20	40	22
Maude Kirkpatrick, Persia, Tenn. R. No. 1 (39)	5	6	3	4	22	40	22
Fred Lindauer, Millstack, Ill. R. No. 1, Box 63 (40)	2	7	4	5	22	40	22

PROPAGATED VARIETIES

Stabler (perfect form) T. P. Littlepage (1)	3	20	3	13	22	61
Stabler (one lobe type) J. Russell Smith (2)	2	25	1	0	77	45
Ohio, J. Russell Smith (3)	3	8	4	12	25	52
Thomas, Amelia Riehl (4)	6	9	4	7	25	51

Note—The quality and flavor of the Stabler kernel one lobe type, noted above is abnormal. Both these and perfect form from the same source had spoiled to a degree. Normal flavor would have registered 22 points for quality and flavor of kernel a total score of sixty, which is interesting from the fact that the increased points from much better cracking quality is neutralized by losses in points for size and proportion of kernel.

NUTS WITH HIGHEST RATINGS FOR VARIOUS CHARACTERISTICS

			Point
Size	(1)	C. E. Vandersloot, Muddy Creek, Forks, Pa. (25) 34.0	10
	(2)	B. J. Tilley, Murfreesboro, N. C. (11) 32.2	9
	(3)	C. D. Asbury, Augustza, Ky. (3) 29.6	8

Cracking Quality:

		Comm.	Abs.	
(1)	Ralph Throp (one lobe type) Greensburg, Ind. R. 8 (4).	100.0%	66.7%	38
(2)	Stabler (one lobe type)	100.0%	52.0%	35
(3)	Elmer R. Meyers (per. form) Bellefontaine, O. R. 2 (22).	100.0%	0.0%	25
(4)	C. E. Mark (perfect form) Washington, C. H., Ohio (7)..	92.5%	0.0%	22
(5)	Stabler (perfect form)	84.0%	0.0%	20
(6)	J. W. Hopgood, Athens, Ill. (5)	83.3%	0.0%	19
(7)	H. V. Stambaugh, Browning, Ill. (1).....	81.5%	0.0%	19

Color of Kernel:

(1)	John Muriel Thomas, Henryville, Ind. (36).....	5

Proportion of Kernel:		Prop. of Kern.	
(1)	Ten Eyck (1919) Contest	36.4%	15
(2)	Gerald W. Adams (Ohio type) Morehead, Ia. (18).....	33.7%	13
(3)	W. Kelling (Thos. Type) Davenport, Ia. R. 5, Box 119 (30)	32.4%	12

Quality and Flavor of kernel: The greater part of the 38 nuts selected out of over 1200 entered in the contest, which were selected by the judges for detailed examination, were of the highest in this respect.

Thinnest Shell: Elmer R. Meyers, Bellefontaine, O., R. No. 2 (22) cracking pressure 130 Kg. The figure of the cracking pressure of this nut gives a very poor index of the relative thinness of shell of this nut and of the others. Seemingly it is not over half the thickness of the one with the next lowest cracking pressure, Throp (one lobe type) 136 Kg., but the one lobe type with no interior shell partition had nothing to support the shell when cracked on the side.

Pellicle easiest removed: Mrs. Joe Ogden, Bedford, Ky. (21).

1926 Contest	Weight nut	Weight kernel	Wt. kernel dropped out after cracking	Wt. kernel picked out after cracking	Cracking pressure % of kernel	Cracking quality Commercial	Cracking quality	Absolute
	g	g	g	Kg.	Kg.	%	%	%
H. V. Stambaugh (1)	21.8	6.5	0.0	5.3	301	29.8	0.0	81.5
John Rohwer (2)	20.4	5.8	0.0	4.6	216	28.4	0.0	79.3
C. D. Asbury (3)	29.6	8.3	0.0	5.8	254	28.0	0.0	69.9
Ralph Throp (4)	13.1	2.4	1.6	2.4	136	18.3	66.7	100.0
J. W. Hopwood (5)	22.4	5.4	0.0	4.5	345	24.1	0.0	83.3
Ballard Robinette (6)	27.9	6.6	0.0	5.1	273	23.7	0.0	77.3
C. E. Mark (7)	15.8	4.0	0.0	3.7	370	25.3	0.0	92.5
Herbert Burton (8)	26.2	6.2	0.0	4.3	385	23.7	0.0	69.4
Mrs. William Patterson (9)	15.1	4.7	0.0	3.0	350	31.1	0.0	63.8
W. F. Stout (10)	12.4	4.0	0.0	2.0	197	32.2	0.0	72.5
B. J. Tilley (11)	32.2	8.3	0.0	4.1	274	25.8	0.0	48.4
Frank N. Hare (12)	20.4	5.5	0.0	3.9	279	27.0	0.0	70.0
J. J. Knapke (13)	18.9	5.5	0.0	3.7	291	29.1	0.0	67.3
C. T. S. Hobbs (14)	25.3	6.9	0.0	4.3	307	27.2	0.0	62.3
Will L. Schimmoller, (15)	14.4	4.3	0.0	2.6	210	29.9	0.0	60.5
Mrs. Geo. I. Bontz (16)	16.2	4.7	0.0	3.6		28.0	0.0	76.5
J. W. Warehine (17)	14.4	4.1	0.0	2.9	213	28.4	0.0	70.7
Gerald W. Adams (18)	18.1	6.1	0.0	2.5	149	33.7	0.0	41.0
Meyers Bros. (19)	24.4	6.5	0.0	3.6	380	26.6	0.0	55.4
Amelia Riehl (20)	19.0	4.3	0.0	2.7	440	22.6	0.0	62.8
Mrs. Joe Odgen (21)	20.7	5.5	0.0	2.6	265	26.6	0.0	47.3
Elmer R. Myers (22)	7.8	2.5	0.0	2.5	130	32.0	0.0	100.0
R. W. Powers (23)	26.5	6.5	0.0	3.5	273	24.6	0.0	54.0
Miss Florence Shireman (24)	14.7	3.7	0.0	2.2	392	25.2	0.0	59.5
C. E. Vandersloot (25)	34.0	7.3	0.0	3.9	328	21.4	0.0	53.4
David Schock (26)	18.5	5.0	0.0	2.0	317	27.0	0.0	40.0
S. W. Snyder (27)	22.7	6.0	0.0	3.6	300	26.4	0.0	60.0
I. E. Fritz (28)	11.5	3.3	0.0	1.4	158	28.7	0.0	42.4
Mrs. Horace Witty (29)	26.2	6.2	0.0	3.1	316	24.0	0.0	49.2
W. Kelling (30)	19.4	6.5	0.0	2.9	233	32.4	0.0	44.6
James J. Weatherby (31)	14.3	3.6	0.0	2.3	200	25.2	0.0	63.9
J. B. Drake (32)	17.7	4.3	0.0	2.3	405	24.3	0.0	53.5
J. C. Lucas (33)	16.1	4.7	0.0	2.0	233	29.2	0.0	42.5
Mrs. W. M. Morton (34)	20.3	4.5	0.0	1.8	275	22.2	0.0	40.0
Robert L. Atkins (35)	16.3	4.6	0.0	1.1	307	28.2	0.0	23.9
John Muriel Thomas (36)	13.7	3.7	0.0	1.0	271	27.0	0.0	27.0
Lillian E. Morton (37)	20.1	4.3	0.0	2.4	380	21.4	0.0	55.8
W. A. Creitz (38)	14.5	4.0	0.0	1.8	270	27.6	0.0	45.0
Maude Kirkpatrick (39)	21.6	4.7	0.0	1.9	304	21.8	0.0	40.4
Fred Lindauer (40)	12.6	3.0	0.0	1.3	174	23.8	0.0	43.3

PROPAGATED VARIETIES

Stabler (perfect form) (1)	15.8	5.6	0.0	4.7	166	33.8	0.0	84.0
Stabler (one lobe type) (2)	14.7	2.5	1.3	17.3	173	17.0	52.0	100.0
Ohio (3)	17.3	5.6	0.0	2.7	248	32.4	0.0	48.2
Thomas (4)	25.1	6.7	0.0	3.4	237	26.8	0.0	50.7

SCORE CARD 1926 CONTEST—BLACK WALNUTS

WEIGHT 10 POINTS

Heaviest		Lightest	
Vandersloot 1926 Contest—34.0 Grams.		Elmer R. Myers 1926 Contest—7.8 Grams.	
34.0g and over	10 points	20.5 to 23.1	5 points
31.3 to 33.9	9 points	17.8 to 20.4	4 points
28.6 to 31.2	8 points	15.1 to 17.7	3 points
25.9 to 28.5	7 points	12.4 to 15.0	2 points
23.2 to 25.8	6 points	9.7 to 12.3	1 point
		7.0 to 9.6	0 point

CRACKING QUALITY COMMERCIAL 25 POINTS

Highest Alley 1919 Contest, 100%—Stabler 1 lobe 1926 Contest—100%

Lowest Butler 1919 Contest 22.9%. 100%—25 points.

96.8 to 99.9—24	80.8 to 83.9—19	64.8 to 67.9—14	48.8 to 51.9—9	32.8 to 35.9—4
93.6 to 96.7—23	77.6 to 80.7—18	61.6 to 64.7—13	45.6 to 48.7—8	29.6 to 32.7—3
90.4 to 93.5—22	74.4 to 77.5—17	58.4 to 61.5—12	42.4 to 45.5—7	26.4 to 29.5—2
87.2 to 90.3—21	71.2 to 74.3—16	55.2 to 58.3—11	39.2 to 42.3—6	23.2 to 26.3—1
84.0 to 87.1—20	68.0 to 71.1—15	52.0 to 55.1—10	36.0 to 39.1—5	20.0 to 23.1—0

CRACKING QUALITY ABSOLUTE 20 POINTS

100%—20

Highest 100%		Lowest 0	
95 to 99.9—19	70 to 74.9—14	45 to 49.9—9	20 to 24.9—4
90 to 94.9—18	65 to 69.9—13	40 to 44.9—8	15 to 19.9—3
85 to 89.9—17	60 to 64.9—12	35 to 39.9—7	10 to 14.9—2
80 to 84.9—16	55 to 59.9—11	30 to 34.9—6	5 to 9.9—1
75 to 79.9—15	50 to 54.9—10	25 to 29.9—5	0 to 4.9—0

PROPORTION OF KERNEL 15 POINTS

Highest, Ten Eyck, 1919 Contest, 36.4% Lowest, Seefeldt, 1919 Contest, 16.0%

36.4% 15		
35.0 to 36.3—14	28.2 to 29.5—9	21.4 to 22.7—4
33.7 to 34.9—13	26.9 to 28.1—8	20.1 to 21.3—3
32.3 to 33.6—12	25.5 to 26.8—7	18.7 to 20.0—2
31.0 to 32.2—11	24.2 to 25.4—6	17.4 to 18.6—1
29.6 to 30.9—10	22.8 to 23.1—5	16.0 to 17.3—0

HICKORIES FOR THE CHESAPEAKE REGION

By W. C. Deming, Connecticut

Anyone might be excused for feeling diffident in approaching the subject of instruction in growing nuts, or almost anything else, for the fortunate inhabitants of this favored region. It is more a place where one would come to learn than to teach. Before your own eyes are the living proofs of the very things that the N. N. G. A. has been working for so many years. Yet, sometimes, outsiders coming in can see what the insiders, from their very nearness, overlook. I have been asked to tell what can be done here, profitably, with the hickories.

I shall not speak of the pecan hickory because you probably already know more about it than I do, and because there are other members of the association present who may know more about it than either of us do.

Of the other species of hickory only three, at present, need attention, the shagbark, C. ovata, the shellbark, C. laciniosa, and the hybrids.

The shagbark nuts, gathered from chance grown, natural trees, and already tithed by the squirrels, sell in most grocery stores for 10 to 20 cents a pound. They are a mixed lot mostly small, weather-stained, thick-shelled, nutpick varieties. Once in a while some old man, who doesn't feel good for anything else, brings in to particular customers the product of some special tree and get a special price—if he knows enough. Then think of being able to put on the market large quantities of just such nuts, of the finest hickory nuts you ever saw, white, uniform, large, thin-shelled and of the real hickory flavor! Many think that such nuts would command as high prices as do the best pecans. But it has never been done. A strange neglect!

This association has rescued some of these fine hickories, and trees grafted from them are bearing in a few places. Now what shall we do in order to grow such nuts for market?

What would you do if you wanted to grow an orchard of Albemarle Pippins? You might buy some trees of a nurseryman and have them

turn out to be Ben Davis or Smith's Cider. But you won't have any such trouble with the nut tree nurseryman. They haven't enough trees to get the varieties mixed. I don't know just how many grafted hickories the nut nurserymen have but possibly you couldn't get enough to set out many acres. After you had them set you would probably have a time getting them established. And they would be expensive. It takes time and labor to grow them in the nurseries. These difficulties could be overdone if there were a larger demand for the trees. But it is a vicious circle. Small demand, few and expensive trees; few and expensive trees, small demand.

When I try to write about the hickories I sometimes take a pessimistic vein, although at heart I am one of the greatest of the optimists. But perhaps showing up the difficulties to a people of energy and determination is just the way to get them to say, "By gum, we'll do it, anyhow."

I take it that you have many thriving native hickories of different species. There is no doubt that these can be easily topworked to fine varieties, that the grafts will flourish, and bear at an early age. In the south, orchards of pecans are made by grafting native hickory stocks. A similar thing can be done here with the other hickories by those who have the native stocks. The shagbark appears to be the best all around stock for all the hickories, except perhaps the pecan. There can be little question about the suitability of the bitternut as a stock for its hybrids. Most of the hickories grow well on the bitternut and the pecan, although Dr. Morris thinks that as stocks they may push the tops so as to interfere with full bearing. The shellbark should be good for the shellbark and its hybrids but we know little about its value for other species and varieties. The mockernut, C. alba, and the pignut, C. glabra, are doubtful stocks except for a very few varieties, as so far tested. But all these doubts should soon be cleared by comprehensive experiments that Mr. Bixby is making.

Varieties

We know very little about the productiveness of the hickories that we are cultivating. In Mr. Bixby's list of varieties the Weiker is the only one whose productiveness is noticed. This is mentioned as twelve bushels one year. Dr. Morris says that Vest and Taylor bear average crops.

We know little about their soil and climatic requirements. Possibly they will be fickle when moved far from home.

The Weiker, although believed to be a shagbark-shellbark hybrid, may be classed for practical purposes as a shagbark. It is a large, attractive nut of good quality though rather thick shelled. I think it will prove to be one of the best for commercial purposes. The Taylor is favored by Dr. Morris, the Vest by Mr. Bixby, the Kentucky by Mr. Littlepage, the Kirtland by Mr. Jones. The Barnes thrives on mockernut stock. The Brooks thrives on pignut. Triplett and Manahan are other good nuts.

Of the shellbark I can say very little as only one variety, the Stanley, has been much propagated. This is a fairly good nut. Mr. Snyder has referred to a number of varieties that perhaps he can tell us about.

Of the hybrid hickories more are being propagated in nurseries than of the pure shagbarks. These are peculiar in appearance and flavor and have not been tried on the market. The remarkable McAlister and Rockville hickans I am told have failed in the south but they appear to have elements of promise farther north. The Laney, Fairbanks, Beaver, Siers and Pleas are all worthy of trial. There are other meritorious hybrids.

To sum up for the hickories, I heartily recommend topworking native hickories with the varieties and on the stocks that I have described.

For those who have no native hickories to topwork I hardly know what to recommend. Perhaps the most promising thing that I can suggest would be to set nursery pecan trees, which are easily obtainable, and topwork them. This can be done the year they are set or after they are established. Perhaps the former is preferable.

I regret that I cannot be more specific or encouraging. There is much that is still experimental in the hickories.

NUTS EXHIBITED BY U. S. DEPARTMENT OF AGRICULTURE

Pecans

Variety	Grower	Location
Busseron	J. F. Jones	Lancaster, Pa.
Indiana	J. F. Jones	Lancaster, Pa.
Posey	J. F. Jones	Lancaster, Pa.
Major	J. F. Jones	Lancaster, Pa.
Butterick	J. F. Wilkinson	Rockport, Ind.
Warrick	J. F. Wilkinson	Rockport, Ind.
Niblack	W. C. Reed	Vincennes, Ind.
Norton	A. L. Norton	Clarksville, Mo.
Green River	T. P. Littlepage	Bowie, Md.

Persian *(English)* Walnuts

Sypherd	C. D. Sypherd	Dover, Del.
Lancaster	J. F. Jones	Lancaster, Pa.
Hall	L. C. Hall	Fairview, Pa.
Holden	E. B. Holden	Hilton, N. Y.
Sheffield	Mrs. S. T. Poteet	Sharon, Md.
Mount	J. S. Mount	Hamilton Square, N. J.
Mayette	Ely I. Hutchinson	Concord, Calif.
Lea	Miss Lea	Wilmington, Del.

Chinese Walnut

Juglan regia chinensis	Market Place	Tien-tsien, China

Black Walnuts

Stabler	A. E. Phoebus	Rt. 2, Brookville, Md.
Galloway	Dr. C. C. Galloway	Takoma Park, D. C.
Thomas	E. A. Riehl Farm	Godfrey, Ill.
Ohio	J. F. Jones	Lancaster, Pa.

Japanese Walnuts

Juglans sieboldiana	Laura Bennett	Camilla, Ga.
Juglans cordiformis (Faust)	J. F. Jones	Lancaster, Pa.
Lancaster	J. F. Jones	Lancaster, Pa.

Manchurian Walnut

Juglans mandshurica	Market Place	Antung, China

Hybrid Walnuts

Royal (Juglans californica x J. nigra)		Cathedral Oaks, Calif.
Paradox (Juglans regia x J. californica)	Joseph Sexton	Goleta, Calif.

Butternuts

Seedlings—Dr. Emory ..... Bureau of Chemistry and Soils
Seedlings—W. W. Farnsworth ..... Ohio
Juglans Bixbyi—Arlington Farm ..... Rosslyn, Va.
Juglans Bixbyi—W. G. Bixby ..... Baldwin, L. I., N. Y.

Chestnuts

Progress—E. A. Riehl ..... Godfrey, Ill.
Van Fleet—E. A. Riehl ..... Godfrey, Ill.
Fuller—E. A. Riehl ..... Godfrey, Ill.
Parry—Parry Bros. ..... Parry, N. J.
Boone—R. B. Endicott ..... Villa Ridge, Ill.
Japanese—J. H. Hudgens ..... Creola, Ala.

Hickory Nuts

Manahan—James Moser ..... Sabillasville, Md.
Kirtland—Mrs. H. S. Kirtland ..... Yalesville, Conn.
Vest—L. W. Vest ..... Blacksburg, Va.
Weiker—Christian Lefevre ..... Lampetre, Pa.
Hales—Henry Hales ..... Ridgewood, N. J.
Hicoria ovata (Shagbark)—Dr. W. H. Holland ..... Ninety-Six, S. C.
Hicoria aquatica (Water hickory)—Market Place ..... Washington, D. C.
Hicoria laciniosa (Shellbark)—Dr. W. H. Holland ..... Ninety-Six, S. C.
Hicoria alba (Mocker nut)—Dr. W. H. Holland ..... Ninety-Six, S. C.
Hicoria glabra (Pig nut)—Market Place ..... Washington, D. C.

Filberts

Barcelona—Conrad Vollertsen ..... Rochester, N. Y.
White Lambert—Conrad Vollertsen ..... Rochester, N. Y.
Red Lambert—Conrad Vollertsen ..... Rochester, N. Y.
Buttner—Conrad Vollertsen ..... Rochester, N. Y.
Noce Lunghe—Conrad Vollertsen ..... Rochester, N. Y.
Minna—Conrad Vollertsen ..... Rochester, N. Y.
Italian Red—Conrad Vollertsen ..... Rochester, N. Y.
Large Globe—Conrad Vollertsen ..... Rochester, N. Y.
Hallische Riesen—Conrad Vollertsen ..... Rochester, N. Y.
Burkhardt—Conrad Vollertsen ..... Rochester, N. Y.
Gunzelbener—Conrad Vollertsen ..... Rochester, N. Y.
Bonybush—Conrad Vollertsen ..... Rochester, N. Y.
Medium Long—Conrad Vollertsen ..... Rochester, N. Y.
Daviana—Conrad Vollertsen ..... Rochester, N. Y.
Early Globe—Conrad Vollertsen ..... Rochester, N. Y.
Du Chilly—A. A. Quarnberg ..... Vancouver, Wash.
Nottingham—A. A. Quarnberg ..... Vancouver, Wash.
Barcelona—A. A. Quarnberg ..... Vancouver, Wash.
Trebizonde—A. A. Quarnberg ..... Vancouver, Wash.
Rush—J. F. Jones ..... Lancaster, Pa.
Merribrooke—Dr. R. T. Morris ..... Cos Cob, Conn.
Montebello—Homer Kruze ..... Sherwood, Ore.
Corylus avellana (European Hazel)—Market Place ..... France
Corylus rostrata (Beaked Hazel)—Oreg. Agr. Col. ..... Corvallis, Ore.
Corylus colurna (Tree Hazel)—F. P. I. ..... China

Other Exhibits

English Walnut (W. Mayette)—J. W. Hershey ...East Downingtown, Pa.
Black Walnut (Ohio)—J. W. Hershey .....East Downingtown, Pa.
Black Walnut (Stabler)—J. W. Hershey .....East Downingtown, Pa.
Pecan (Busseron)—J. W. Hershey .....East Downingtown, Pa.
Black Walnut (Thomas)—J. W. Hershey .....East Downingtown, Pa.
Hybrid Hickory (McAllister)—J. W. Hershey ....East Downingtown, Pa.
Carya laciniosa x carya olivae formis—" .....East Downingtown, Pa.

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NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS OF THE

NINETEENTH ANNUAL MEETING

TORONTO, CANADA

SEPTEMBER 10, 11, 12, 1928

NORTHERN NUT GROWERS ASSOCIATION

(INCORPORATED)

REPORT

OF THE PROCEEDINGS OF THE

NINETEENTH ANNUAL MEETING

TORONTO, CANADA

SEPTEMBER 10, 11, 12, 1928

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Penney, Senator Harvey A., 425 S. Jefferson Ave., Saginaw
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University of Michigan, Botanical Dept., Ann Arbor

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Andrews, Miss Frances E., 245 Clifton Ave., Minneapolis
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Cothran, John C., 134 College Ave., Ithaca
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Hodgson, Casper W., World Book Co., Yonkers
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CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association, Incorporated.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection

being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. Annual members shall pay five dollars annually, to include one year's subscription to the American Nut Journal, or three dollars and fifty cents not including subscription to the Nut Journal. Contributing members shall pay ten dollars annually, this membership including a year's subscription to the American

Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

There shall be an annual, non-voting, membership, with privilege of the annual report, for all County Agents, Agricultural College and Experiment Station Officials and Employes, State Foresters, U. S. Department of Agriculture Officials, Editors of Agricultural Periodicals, College and High School Students, Boy Scouts, Girl Scouts or Camp Fire Girls and similar organizations, on payment of one dollar as annual dues.

Article III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Article V

Members shall be sent a notification of annual dues at the time they are due, and if not paid within two months, they shall be sent a *second notice,* telling them that they are not in good standing on account of non-payment of dues, and are not entitled to receive the annual report.

At the end of thirty days from the sending of the second notice, *a third notice* shall be sent notifying such members that unless dues are paid within ten days from receipt of this notice, their names will be dropped from the rolls for non-payment of dues.

REPORT OF THE PROCEEDINGS

at the

NINETEENTH ANNUAL CONVENTION

of the

NORTHERN NUT GROWERS ASSOCIATION
(Incorporated)

Held at the

KING EDWARD HOTEL

TORONTO, ONTARIO

September 10, 11 and 12, 1928

Mr. Willard G. Bixby, Baldwin, N. Y., the President of the Association, occupied the chair.

He called the convention to order at 11 o'clock Monday, September 10th. The President then delivered his official address.

THE PRESIDENT'S ADDRESS

This is our 19th meeting. It is also the first meeting ever held outside the boundaries of the United States and it gives me great pleasure,, as I am sure it does all of our members, to meet in this important city of the Dominion of Canada and talk over the problems of nut growing in the northern part of the American continent.

The past year has been one of achievement. Nut growing has steadily progressed, our few commercial nut orchards have been established more firmly than ever, new ones are being planted and those planted a short time ago are getting nearer the time when they will bear nuts in commercial quantities. One established in the past four or five years has had the fortune, or misfortune, to have oil dis-

covered near it and we are not quite sure whether to congratulate the owner on his apparent start on the road to wealth or commiserate with him over the probable loss of his nut orchard. An experimental orchard, where practically every fine variety is to be found, reports the older plantings bearing to quite an extent, and that many cross pollinations were made this spring as the first step in making hybrids between species and varieties, which work has not heretofore been attempted, at least not to any extent.

During the past year we have suffered the loss of the first ex-president to pass away, the Hon. W. S. Linton of Saginaw, Michigan, who was the first to gather the black walnuts from Washington's home at Mount Vernon and to distribute them for planting by school children. This year also marks the passing of Mr. J. F. Jones of Lancaster, Penn., universally known to have been the foremost nut nurseryman in the country, and who has done more than anyone else to develop nut tree propagation and nut tree growing, so that those who desired to plant nut trees might be able to get them. I expect that there will be at this meeting those who will bring to us much more about these men than I can attempt to note in a president's report.

During the early part of the year some things became out of balance, particularly finances, and this was of much concern to many members. The president's office for a time was deluged with letters calling attention to the fact that there were not on hand sufficient funds to pay for printing the proceedings of the Easton meeting of 1927, and various plans were suggested for correcting this condition. One suggested not printing the report and depending on the American Nut Journal to print the material now going into the proceedings. Considerable study was put on this and it was finally decided that this was inadvisable and that the thing to do was to raise what money was needed by direct appeal to those who were believed to be able and willing to contribute for the purpose. This cleaned up the matter.

The membership at the present time, as shown by the last two reports, is in the neighborhood of 200, and yet the receipts from membership dues as noted in the same reports were $337.50 and $346.00 respectively, which would seem to show an active due paying member-

ship of about 100. The annual expenditures are between $600.00 and $700.00. Of these expenditures about $300.00 is for printing the annual report, $200.00 or so for the convention and $100.00 for miscellaneous expenses of postage, printing, etc. These expenses are exceedingly modest. We do not even pay our secretary a salary, which we really should. The balance, $300.00 per year, has been made up by contributions from members who believe the association to be doing worth while work and are willing to contribute in this way.

This method of financing is far from satisfactory, and yet I know of no religious, social or scientific organization, where I am closely enough informed to know the real inside workings, where financing in the final analysis is not conducted on this plan. It may be disguised in the form of memberships of different classes where some members pay several times what others do, or as in churches where members are expected to give "as they are able", but when you get right down to the inside facts, it is a faithful few who stand behind and keep things going. In the exceptional case we sometimes hear of the exception is because some individual, perhaps the secretary, contributes in labor far above what he is paid for, and perhaps through his efforts may seemingly make an organization self-supporting, each member paying only a predetermined membership fee. This, however, only proves the rule above, for in such a case it is the "one" instead of "a faithful few" who is standing behind and keeping things going.

Some remarkable instances of early bearings have come to our attention during the past year. A Griffin hickory set out in the fall of 1926 is bearing two nuts at this writing, and a Saugatuck butternut 30 inches high is bearing two nuts. While these are unusual, particularly the hickory, which is proverbially slow in coming into bearing, it has shown that under proper conditions of soil, climate and attention, grafted trees will bear as early as apple trees, and that no one need be deterred from planting nut trees for fear it will take from 20 to 25 years before they will bear. Data have been accumulating as to the yields that may be expected from nut trees, at least what certain nut trees have done. It is expected that much information of this nature will be brought out at this meeting. While records of the

bearing of nut trees, both as to earliness and prolificness, have usually been understood to be with trees carefully cultivated and heavily fertilized, this is not the usual condition under which nut trees grow, for they are frequently found bearing good crops when growing on land so rough that cultivation is impossible. They probably will not bear as large crops over a series of years, but it is believed that paying crops can be so grown, and so land may be utilized for nut growing that is too steep for regular farm crops. It is expected that we will learn at this meeting something that is being done in this line. Indeed it is hoped and believed that this meeting will record more facts regarding commercial nut growing than have heretofore been gotten together.

THE SECRETARY'S REPORT

The secretary takes pleasure in reporting to the members that the nterest of the general public in nut bearing trees for food or shade s steadily growing.

Last year the reward offered for a better black walnut than was hen known aroused great interest. As a result the correspondence of he secretary and especially of the committee in charge was so great is to be really burdensome. This year, while this correspondence has iot been so heavy it has shown, however, that the inquiries were)rompted by a real interest in nut trees rather than in a chance to :arn a few dollars and some publicity through a contest.

The secretary wishes to correct a misunderstanding as to the attiude of one of the railways requested to give publicity to the contest 'or better black walnuts. The secretary stated in 1927, that the llinois Central railway and the Wabash railway published the parículars of the walnut contest, but said nothing about the Chicago Rock sland and Pacific railway, although that road was mentioned as one /hich had been requested to print the particulars in its magazine.

The person to which the request was made evidently turned over he letter to some subordinate. Possibly each thought the other had nswered the letter. As a consequence, the secretary never knew the ate of the request until the report of the convention of 1927 was ead by one of the officials of that railway. He sent a copy of the iagazine published by that company to the secretary. It contained ll the rules of the contest for a better black walnut, also a fine ditorial comment on its importance to the general public, and esecially to those living in the territory served by that company, in iany miles of which the walnut grows vigorously.

The secretary takes this opportunity to thank the Chicago, Rock sland and Pacific railway for its cooperation last year, and reets that our appreciation was not expressed before. The delay is ie to the error in the offices of the railway company.

During the past year a large number of persons have written for irticulars concerning nut culture. Many wish to know from whom buy trees, others what varieties to plant. Some wanted to know

which kind would grow most successfully in their soil and climate, others wish to know how to bud, graft, top work trees, how to cultivate and when to do so. Again, information was requested about fertilizers, both as to time of application and kind to use.

Letters came from California, Washington, Arizona, Oklahoma, Ohio, Florida, Massachusetts, Maine, and other states. Your secretary has learned much about soils, flora, and the plans of persons interested in nut trees. He is not a pomologist, but a dodger. When questions about walnuts arise, he refers to the agricultural department at Washington, D. C., and recommends the purchase at five cents each, of farmers' bulletins, Nos. 1392 and 1501. These publications cover the planting, propagation, budding and grafting of the trees, the curing and care of the nuts, as well as the cutting of the timber for lumber.

When someone applies for aid concerning other nut trees than the black walnut, he hides behind Dr. Robert T. Morris's book on "Nut Culture." He even goes as far as to refer to that book as good reading from a literary standpoint, because of the beauty of the language and the strain of humour running from cover to cover.

When it comes to soils your secretary generally refers writers to the department of agriculture of their own state, and to certain men who have for years made a business of propagating nut trees. They either know themselves or, through the experience of their customers, have learned the soils of many of the states, the nature of the climate, and can give sound advice upon such matters.

Sometimes the quantity of mail received was quite large. It demonstrated that there is a wide spread interest in nut trees for food and shade. If we only had the money to extend our educational features I am sure many more people would appreciate the objects of this association, and would aid us in carrying on our plans to success. Your secretary in most instances urged writers asking for information to join the association. Quite a number did so and one remittance was forwarded to him since reaching Toronto. It is almost certain that the membership of this organization can be greatly increased if each member will urge his friends to join, or if he will

stress its aims and merits in his business correspondence. It is the personal contact which counts.

Among the letters coming to the secretary's office, were many in which reference was made to the kindness of Mr. J. F. Jones of Lancaster, Pa. He has gone to his reward, and in his death we have suffered a loss beyond measure. One writer wrote "All my knowledge about nut trees came through the kindness of Mr. Jones. Whatever success I have had is due to his advice and courteous instruction."

Many others wrote of Mr. Jones in a similar manner. Among others who have passed on during the last year, whose names were sent to the secretary's office were the following: Newman Hungerford, Torrington, Conn.; Admiral Francis T. Bowles, Barnstable, Mass.; Charles O. Harmon, Cassopolis, Mich.; A. W. Copeland, Birmingham, Mich.; Joseph C. Miller, Marland, Okla.

Since your secretary reached Toronto he has been impressed by the politeness and goodwill manifested by all to visitors to the national exhibition.

He was greatly pleased to read in the press accounts of the League of Nations convocation, that representatives of all nations present were thrilled by the honorable premier, William Lyon McKenzie King's description of the boundary line between Canada and the United States, which stretches across three thousand miles of the continent, but has no army or navy, no sailors or soldiers to protect it. Yet for more than 100 years, it has been a line of peace.

The nations of the old world may well take a lesson from the new. Their boundaries may be equal lines of peace and prosperity if they will but adopt the policy of Canada and the United States, namely,—THERE IS NOT NOR EVER SHALL BE A TARIFF ON GOODWILL.

THE TREASURER'S REPORT

Financial statement of the Northern Nut Growers Association for the fiscal year from September 1st, 1927 to August 31st, 1928, both dates inclusive

RECEIPTS

From previous year	$156.08	
Balance in nut prize fund	16.46	
		$172.54
From life memberships		50.00
" student memberships		1.00
" membership plan No. 6		144.00
" " " No. 9		8.50
" " " No. 11		137.50
" " " No. 12		2.75
" " " No. 13		14.00
" contributions		285.25
" sales of literature		11.50
" interest		.74
		$827.78
Expenditures		$606.05
Balance at close of the year		$221.73

Said Balance Consists of—

Deposit in Middletown National Bank, Middletown, Ct.	$201.50
Deposit in Litchfield Savings Society, Litchfield, Ct.	15.94
Cash on hand	4.29
	$221.73

DETAIL OF EXPENSES

Stamps sent to secretary	$ 20.00
Government envelopes for secretary	2.29
Stamps sent to Dr. Deming	6.00
Postal cards for treasurer	1.00
Postage	16.99
Insurance	.39
Money order fee	.07
Registry fee	.15
Stenographic work, multigraphing, etc. (Violet Bourne)	89.70
Typing list of members (Florence R. Sloane)	1.50
Envelopes	14.75
Express	5.74
500 annual reports (18th) 140 p.p. including covers at $2	280.00
Addressing envelopes and mailing	6.00
Letterheads	15.75
Printing letterheads on stock furnished	3.50
Expenses of secretary—trip to Easton, Md., and return	103.70
Reporting 18th convention (Mrs. S. K. Oswalt)	30.00
Expenses at 18th convention (Mrs. S. K. Oswalt)	8.50
Exchange on funds sent from Washington, D. C.	.02
	$606.05

THE CHAIR, referring to a balance in the treasurer's statement of $16.46, carried over from the special nut prize fund, asked for the action of the meeting to place this in the general fund. This was voted.

THE CHAIR asked Senator Harvey A. Penny of Saginaw, Mich., if he would speak to the convention about ex-president Linton, remarking that Mr. Linton was first of the ex-presidents to pass away.

Senator Penny gave a brief sketch of the long and useful life of Mr. Linton, most of which was spent in Saginaw, Mich. Among other things he said: He attended our schools and later on became interested in the lumbering business. His father was a lumberman but he worked for other people, and for years was a lumber scaler, then bookkeeper for a while, and later on became engaged in the lumber business himself in Saginaw. I presume it was then that he acquired his love for nature and for the big pines that he helped to destroy. That was then considered their only use. You raise nut trees because you want their fruit, but a pine tree was considered only good for its lumber. Up near Saginaw we had the finest white cork pine in the world. This pine has all disappeared. Great fortunes were made in Saginaw. In our city of Saginaw 25 years ago, I think there were more wealthy men than in any city of its size in the United States. Most of those men have gone and have passed their business along to the public, building fine institutions, schools, etc. Mr. Linton never acquired much wealth, but I have often said that he did more for our city than any other one man. He was eternally working on some proposition for the benefit of our city. He was president of the Board of Commerce before he became a member of this association and he bought carloads of shrubbery and sold it at cost around the city. While I was in the legislature I never had anyone give me the help he did on a great many things. One of the things he did was to draft a bill for the planting of nut trees on the highways. He prepared the bill and gave it to me and I presented it to the legislature and got it passed. The highway department has a man whose business it will be to pay special attention to the planting of trees on the highways. So far they have not done a great deal, although they have a lot of trees ready, because they have been more anxious first to get the rights of way and have the highways laid out.

Then they intend to beautify them. That is just one of the things Mr. Linton did. He worked night and day, almost, doing something for the city or the state. He might perhaps look at the map and say, "There are two trunk lines which do not connect. Their connection will be a great benefit to Muskegon and Saginaw." He would take it up with the authorities and try to get that connection made.

We have a park in Saginaw called Russ Park. Mr. Russ is a very wealthy man. He took Mr. Linton over to Europe and Egypt, and after returning presented Mr. Linton with a 25-ft. launch. Mr. Linton spent a lot of time trying to beautify this park, laying out plots and planning the shrubbery. We have a boulevard called the River Road, from Saginaw to Bay City. It was a marsh and people objected to the expense of fixing it. The boulevard there today is a memorial to his never-flagging energy and constant effort to do for the community. He was eternally spending his time doing those things.

He had no interest in an association of this kind, except that he thought he was helping to promote something for the benefit of mankind. He had no interest and no gain in nut growing except that. That was the reason he joined this association.

Last night when I sat down to think of something to say here I thought I would put it in the form of a resolution for our records.

RESOLUTIONS ADOPTED BY THE NORTHERN NUT GROWERS ASSOCIATION, IN MEMORY OF HON. WILLIAM SEELYE LINTON, OF SAGINAW, MICHIGAN, WHO DIED NOVEMBER 22nd, 1927

At a meeting of this association held on September 10th, 1928, during its annual convention in the city of Toronto, Canada, our members were reminded that an all-wise providence has seen fit to call our beloved past president, the Hon. W. S. Linton, from his labors on earth to an everlasting refreshment, and are deeply and sincerely touched with grief and sorrow at his loss. They desire to pay their highest tribute of honor and respect to his memory, yet realize that mere lettered words and sentiments are but feeble expressions of their high regard for him whom they now mourn, and

WHEREAS, Mr. Linton had given much of his time and talents for the benefit of this association, and we had come to know him as one of its faithful and zealous members, possessed of an unusually pleasing personality that endeared him to all:

He was a loving and devoted member of his family, a loyal citizen, a general companion and steadfast friend, and

WHEREAS, we are justly proud of his membership in this association because of his outstanding life and leadership as a citizen, and for his many splendid attainments and accomplishments in civic and political preferment, for he had been highly honored by his city, state and nation. He was mayor and later postmaster of Saginaw, Michigan, a representative in congress and in the state legislature, a member and also secretary of the Michigan State Tax Commission, and was both president and secretary of the Saginaw Board of Commerce. At one time he received a number of votes in the National Electoral College for that highest office within the gift of the American people, that of President of the United States. In every instance, each position held by him was filled with great honor to himself and fidelity to his trust. In his private life he had been unusually active and colorful in accomplishments for the development of

civic pride, political betterment, industrial expansion and the beautification of public highways, giving his time and talents unceasingly to make others happy without compensation or hope of reward.

THEREFORE, BE IT RESOLVED, That as members of this association, we shall greatly regret the absence of Mr. Linton from our future annual conventions. We shall miss his leadership, his pleasing personality and genuine courtesy. We believe that the world is better for his having lived, and shall ever cherish his memory in high esteem, and hold as worthy of emulation his many lofty ideals, his splendid character, and his untiring devotion to his many friends.

"In the wreck of noble lives
Something immortal still survives,
Death has not taken all away,
This friend is with us still today;
Each one of us still carries on,
Something of him whose soul has gone.

Because he lived and was on earth,
Many lives have known a sweeter birth;
The days were brighter, and the years
With all their hopes and cares and tears,
Are richer in uncounted ways,
By all he did to smooth life's ways."

BE IT FURTHER RESOLVED, That a copy of these resolutions be inscribed upon our records in perpetuation of his memory, and a copy sent to the family of Mr. Linton in testimony of our sympathy and affection.

THE CHAIR asked for nominations for the nominating committee. There were nominated and elected the following: Messrs. Ellis, Walker, Green, Reed, Hershey.

Upon request of the chair, Mr. J. U. Gellatly, West Bank, B. C., spoke on "Nut Culture in British Columbia."

Mr. Gellatly: About 18 or 20 years ago my father brought home a pocket full of nuts and told us boys to plant them. We did so and when they bore we were so well pleased with the result that we

began to make a study of the possibilities of increasing our plantings.

About 1920 I made a survey of our own valley to see what varieties could be located. The collection we have over in the corner is the result of this survey, in which I located a good many trees growing under various conditions and soils, all the way from stony places to gravelly, heavy clay and some of them on almost boggy land.

The nut I am particularly interested in is the Japanese heart nut and I have endeavored to look at every heart nut tree I could get track of within reasonable distance. Those I could not get to I have endeavored to have samples of sent to me by mail.

I have had some experience in root division of the heartnut which may be of interest to you. Taking a tree of about one-half inch thick, down near the base of the tree usually it will throw from two to five sprouts from the root crown, if you cut it in spring about three inches above the root spread. Supposing there were four buds thrown from this crown, just as soon as they are showing I take a fret saw and divide the root into four pieces, each having attached one of the buds. Take each of these roots with buds attached, tie securely to a small stake and plant stake and root in good potting soil covering to a depth of one inch.

Last year I had a Japanese walnut tree damaged and I cut it off near the ground. It sprouted from the stump. This year I removed all the surface soil covering a radius of four feet from the tree to a depth of six inches. Then I laid the last year's sprouts down like the spokes of a wheel from the centre and covered them over with good soil to a depth of six inches, turning the ends up six inches above the soil. When they started to grow they sent up, from four to five shoots from each layer. The first two shoots had not made any root growth when examined, but the third and fourth each showed root growth on the various layers.

There is an advantage in this method of propagation over an ordinary grafted tree in that the resultant tree is on the original, or parent, root system, or more correctly its own root system, in contrast to the adopted root system of a grafted tree. In event of accident or injury to the trunk of the tree, it will come true to type from the crown, whereas the grafted tree would throw an unknown seedling sprout.

With the filberts we have had good success in layering, but no

success in rooting from cuttings, as some of the old country people tell you they have. All our filbert trees are seedlings and we have had good pollenation.

As regards cropping, Japanese walnuts seem to vary somewhat from year to year, but we have never had a failure either in filberts or Japanese walnuts.

QUESTION: Have you grafted or budded Japanese walnuts?

MR. GELLATLY: We have tried it but with very little success. We have had some, but nothing that you could call commercial success. I put five patch buds on one Japanese walnut and all took but failed to grow. Ever since then the growth on the black walnut stocks has been much faster and the result is the trees double around the bud patches like your fist, which will make a pretty piece of walnut burl.

MR. GREENE: How deep would you cover your sprouts when you layer them?

MR. GELLATLY: About six inches. I put in some well-decayed barnyard manure. Sometimes soil alone hardens and you would have difficulty with the sprouts coming through after the soil was hard.

QUESTION: You have had good success in layering and in the division of the heart nut?

MR. GELLATLY: Yes.

QUESTION: That seems to be the way to propagate the heart nut then?

MR. GELLATLY: This is my first experience but I am well satisfied with it.

QUESTION: That would only be desirable for trees of known merit?

MR. GELLATLY: Yes. You could propagate any kind but there would be no object in propagating anything that you did not know to be of value.

MR. SPENCER: Some years ago I bought a half dozen filberts in Rochester, New York. The bushes now are about as high as this ceiling and have never had a nut on them. Occasionally I have seen catkins one-half and one and a half inches long. I should like to know how to get nuts.

MR. GELLATLY: We have had the same difficulty. I have no theory to advance except that in the case of my neighbors, where also

the trees did not bear, while mine did, it just chanced that they were too near alike. We find that maybe one tree is doing most of the pollenation for the bunch, and if that tree was removed you would not get any crop to speak of. One tree in our own block was a prolific pollenizer.

Question: Most of the trees are of one variety?

Mr. Gellatly: That has everything to do with it. You might never have bearing if you did not get pollenation from some outside source.

Mr. Frank H. Frey: May I ask if the hazel or filberts are natives of British Columbia?

Mr. Gellatly: The wild hazel is native.

Member: I was luckier than Mr. Spencer. I received some seedlings from Rochester. One has four nuts on this year, the three others have one each.

Another Member: They were pollenated before you got them.

First Member: Yes I think they were. The catkins were on them when I got them.

Mr. Gellatly: I think your crop was due to the fact that your trees were seedlings and each one different.
the top of the tree and you layered the sprouts that came up afterward?

The Chair: When you layered the Japanese walnut you cut off the top of the tree and you layered the sprouts that came up afterward?

Mr. Gellatly: Yes, the second year.

Chair: And the roots grew not from the second bud that was covered but from the third?

Mr. Gellatly: Yes, from the third and fourth back from the end of the layered tip.

Question: Did the roots come out from the buds or between the buds?

Mr. Gellatly: The bud was on top and the roots came out directly below.

Question: Did it produce a tree on those joints or did a shoot come up?

Mr. Gellatly: There was only one shoot from a bud. Just a few days before I left home the tree was making a lot of new roots.

The Chair: What time of year did you layer it?

Mr. Gellatly: Early in the spring, this past spring.

Mr. Greene: When did you cut off the main stalk of the tree?

Mr. Gellatly: About a year ago last spring. The shoots came up last year. That is a slow way to get started compared to the grafting of apple trees, but it is a sure way.

Mr. Greene: Speaking about your budding and lack of success, I am interested in knowing whether it was what Dr. Morris called "immediate" or otherwise. Did you, at the time you put on your patch bud make the wound on your stock immediately?

Mr. Gellatly: Immediately.

Mr. Greene: I tried that too and was not successful. If you wound your tree with your patch budder ten days previously, it gives the tree a chance to get the healing material on the job. In our budding we always remove all the wood from the patch. I understand from Mr. Hershey he leaves the wood.

The Chair: Mr. Jones usually left some wood on it, that is, the patch budder was used to mark and the patch was removed with the knife. In some instances it did not readily remove. In such instances he removed the wood as well. I don't think there is any harm in removing some of the wood.

Mr. Hershey: I think you will have a complete failure if you don't leave the wood. It will leave an air space, it if does nothing else, to start decomposition. Even if the wood gets loose you can catch it and put it back in.

Mr. Neilson: I had much better success after I left a small bit of wood underneath. Mr. Gellatly, have you ever noticed that buds will start the second year, in cases where they fail to grow the first year?

Mr. Gellatly: That has been our experience.

Mr. Neilson: I found that, in several cases on black walnut, I set the bud patch on the stock and the patch caught but the bud died.

Mr. Gellatly: That is our own experience. Any that grew did so the second year.

The Chair: Did you do your budding in the late summer or fall?

Mr. Gellatly: We did it in the fall.

The Chair: If the budding had been in August 1926, you would have expected it to grow in August, 1927, and it actually did grow in August, 1928?

Mr. Gellatly: That is the idea.

Mr. Hershey: I was down at Petersburg, Virginia, at Mr. Roper's nursery. He said: "Did you ever see an English walnut sprout on a black walnut?" There was a two-year limb of English walnut which came out of the black walnut stock. I said: "Sure enough it will come if you had put a bud on it." He told me that bud had lain there seven years before it actually started to push.

Lady Member: Do you think the audience would be interested in the remark you made to me about bleeding from that tree?

Mr. Gellatly: In cutting back I experimented with tapping, instead of letting all the sap flow from the wounded limbs and run back down the tree trunk, setting up fermentation.

Mr. Hershey: Don't you cut your trees back a week or two before you graft them? In grafting, if I have a stock that will not stop bleeding at the end of two weeks I take my knife and cut away. I am speaking of small stocks.

Mr. Gellatly: I think it is worthy of trial. It is worth while to tap the tree and drain the sap just like the maple tree.

The Chair: In New Hampshire they used to make sugar out of butternut sap.

Professor Neilson read the following extract from a letter of Mr. David Gellatly, a brother of the speaker:

"As a message to the convention, the writer would like to say that he is positive from the results of his twenty-five years of experimental work in nut culture, that the commercial possibilities in British Columbia, for filberts and chestnuts, are assured. The present varieties of the English walnut, however, do not seem to equal filberts and chestnuts in hardiness; though the English walnut has excellent commercial possibilities on the coast and in the extreme southern portion of this province."

Mr. J. U. Gellatly: My brother has done quite a bit of propagating and a lot more experimental work in cross pollenation than I have myself. He has several trees which are now bearing and producing nuts as a result of cross pollenation. One tree, which came into bearing this year, when I left had three nuts about two and a half inches in diameter.

Question: What did the tree look like?

Mr. Gellatly: It shows English and Japanese, and the flowers are something new, different in shape from either the English or the

Japanese. The color is pink—I am speaking of the female flower. The catkins are shorter than the Japanese. It shows a complete cross in regard to the leaf and flower, and the nut shows the cross too.

Mr. Hershey: How many trees did you get out of the cross which are now bearing?

Mr. Gellatly: Six.

Mr. Hershey: I have an old friend who died this year. Out of one hundred crossings he got six trees, and out of the six there was only one that was any good. There was only one characteristic that would lead you to believe that it was anything but English walnut. The clusters were larger.

Mr. Gellatly: That always goes with these crosses. The clusters are larger than the English walnut.

The Chair: This matter of breeding hybrid walnuts is to me of a good deal of interest. It is opening up a field of variation which probably will finally result in improvement. Hybrids between the Japanese heart walnut and the black walnut have been made for a number of years. I saw some in 1920 in Jackson, South Carolina. I have cross pollenated trees which have borne several times, but so far the nuts have not proved of value. I remember a remark was made by the late Dr. Walter Van Fleet, whom I regard very highly as a plant breeder, that he never expected to get much out of the first generation hybrids. These Mr. Gellatly has described are all first generation hybrids, and it may be that we will have to wait for another generation to get something of real value. There is no question that the Japanese heart nut and the black walnut have some qualities that, if they could be added to the English walnut, would increase its value.

Upon motion the morning session adjourned at 12:15.

Monday Afternoon Session

Mr. Willard G. Bixby called the meeting to order at 2:20 o'clock. Controller J. Gibbons, representing Mayor McBride of Toronto, warmly welcomed the convention to the city.

After expressing the regrets of Mayor McBride, Controller Gibbons continued: I wish to extend a very cordial welcome to you all to the city of Toronto. We are always pleased to welcome visitors to Toronto because we realize that every visitor means another booster for us.

Toronto was incorporated a City in 1834 with a population of 9,000 and since that time every ten years it has doubled its population. Today the population of Toronto is over 600,000. Greater Toronto has a population of over 700,000. All you have to do is to look around you to see how Toronto is progressing. We have this year, to the present date, issued over $34,000,000 of building permits, and this does not include the big departmental store which is going up and which they say is going to cost $17,000,000, neither does it include the government Customs House.

Among other things Toronto is noted for its public ownership. Toronto is the largest public ownership city in the world. When you come to Toronto and take a drink of our good water you may know that it is produced by the municipality. We own our own electric railway system at a cost of $45,000,000, our electric light is generated at the falls, but we own our own transmission lines. We have over $34,000,000 invested in that.

Sixty-four per cent of the people in the city of Toronto own and live in their own homes, which I think you will agree with me is a very healthy state of affairs.

Our taxes are a little over 30 mills, and we give the citizens of Toronto more for their taxes than any other city in the world. We spend $9,100,000 on education, that is irrespective of our university, which is the second largest in the world, and you can educate your child in the city of Toronto from the kindergarten up to the highest profession.

We have the healthiest city on the continent. There is less contagious disease in the city of Toronto than in any other city on the

continent. We have a health department on which we spend over $1,000,000 per year.

We have the best lighted city in the world. Our light is produced by public ownership, previous to which we had private ownership. We found we could operate by public ownership at about one-third of the cost. Private enterprise is right behind our public ownership investment because we furnish them a first-class service at a nominal cost.

We have over 2,000 acres in parks. We provide athletic fields for 56,000 athletes. That is one reason we made such a good showing at Amsterdam this year. We realize there is nothing better for our young people than athletics and playgrounds. We have 86 athletic fields. Our buildings are substantial. Any building over two and a half stories has to be fire-proof.

We have over 600 miles of paved streets kept good and clean by the municipality.

We are delighted to have you here. I hope your convention will be profitable, and if there is anything that you want that you have not got, come up to the city hall and tell us. We want you to go away feeling that you have enjoyed your visit.

I might just say a few words about the exhibition which just closed its 50th anniversary. It is the largest exhibition in the world. We have invested $13,000,000 in the buildings exclusive of the grounds. We had over 2,000,000 people go through the gates this year. It is run by a board of directors and we have co-operated with that board. Last year we put up a new building out there at a cost of $1,200,000. To show that public ownership pays, the exhibition, after paying interest and sinking fund, paid into the coffers of the city of Toronto last year $250,000. We are the only people who make a big exhibition pay, and we do it under public ownership.

Doctor J. Russell Smith of Columbia University, paid tribute to the memory of the late J. F. Jones as follows:

Since our last meeting this association has lost one of its most useful and loyal members. In the death of J. F. Jones of Lancaster, Pennsylvania, many members of the association have lost a valued friend and the northern nut industry has experienced the greatest loss it has thus far sustained.

Mr. J. F. Jones typified many of the things I like to think of as being characteristically American. He was a self-made man, a good

man, a useful man and one whom it was a pleasure to meet.

He was a man of science, a creator in that field and at the same time a real business man. This is a rather unusual combination of qualities.

He was born in Missouri in 1871 in what was then very distinctly a frontier locality. He was born in a one-room log cabin as have been so many other Americans before him. As he was the only boy in a rather large farm family, he was able to receive but little formal schooling. These limitations did not keep a hungry intellect from being fed. He read widely and early showed an interest in trees, having several varieties of apple on one tree. He showed his young intelligence by succeeding in bee-keeping, one of the most scientific and skillful of the agricultural pursuits.

In 1896 he and his father started a fruit and nut tree nursery in Missouri. In 1902 he moved to Florida and started a pecan nursery, which succeeded. In 1907 he moved to Louisiana and took charge of a 500-acre pecan orchard for which he had grown the trees. In 1912 he sold this, moved to Lancaster, Pennsylvania and established the first northern nut nursery in America selling grafted trees. From that time until his death in January 1928, he maintained the leading northern nut nursery in the United States. The success of this displayed Mr. Jones' business ability. Not only was it the leading nut nursery but also one of the largest for the growth of cherry trees and also of fruit tree seedlings for which a sudden demand sprang up after the cessation of the import of this variety of nursery stock from Europe.

I believe Mr. Jones to have been an honest man in a business where honesty is difficult to maintain and slight deviations from it are very easy. This of itself is one of the great tributes.

As a scientist Mr. Jones was a good observer and studied nut trees with interest, the interest of a scientist as well as that of a keen business man. For years I have turned to him as a pupil to his master, plying him with questions on many subjects in his field and receiving intelligent answers.

Generosity and public spirit were two of his qualities. One type of man in his position would have jealously secreted his knowledge with the idea of making it a matter of monopolistic profit, but Mr. Jones told freely all that he found out, distributing to his friends not

only new knowledge but scions of new trees. For a long time he was far and away the leading technician in the art of grafting nut trees. He might easily have kept this art a secret, but he taught it far and wide to all who would learn.

He did not neglect the school, the church and the other local things that must be maintained if our neighborhood is to remain a good neighborhood. Mr. Jones was a man of balance, maintaining to a remarkable degree the combination between business ability and activity and the inclinations and habits of the scientific mind which loves knowledge for its own sake. Many of us love knowledge and follow it to the detriment of our business. Mr. Jones did not let scientific interest or love of knowledge or love of experiment run away with his business. While making a living he experimented as a scientist.

Mr. J. F. Jones was a creator, attaining results of marked value. He did much to improve the arts of grafting and budding nut trees but his creative work is best illustrated by his remarkable success in hybridizing hazels and filberts. After two or three years of fruitless work he found that they would hybridize only one way, namely a certain one had to be the male and the other the female parent. After that was learned Mr. Jones grew many hundreds of trees from hybridized seed. These trees showed the marvels of hybridization. Hybrids from identical ancestry ranged in size from 12 inches to 12 feet at the same age, and some of them bore nuts that were much larger than those of either parent.

Mr. Jones had just about reached the point where he could have begun large scale propagation with the idea of making much money from his creations. As a matter of fact, however, this did not interest him. He was more interested in making other discoveries, other creations. He much preferred to breed plants rather than to propagate and sell them. As an example of this, when the Northern Nut Growers Association visited his place in 1926 he had a row of hybrid hickories grown from two of the best strains. These could of course only become valuable by being grown to fruitage, a matter of years and much space. Mr. Jones had no place or plans for the two hundred little hybrid hickory trees but his creative instinct compelled him to produce them just the same.

The cordial hospitality of the Jones home was experienced by nearly every person in America who is interested in growing nuts in

the North, and Mr. Jones' passing leaves a widespread sense of loss in personal friendship as well as that of a leader in business and in the development of useful knowledge and of useful trees. It is too bad that such men are so few.

Mr. Ellis, chairman of the nominating committee, presented the report of that committee as follows: Your committee on nominations takes great pleasure in proposing as your officers for the year ensuing:

President—Mr. Willard G. Bixby

Vice-President—Prof. James A. Neilson

Secretary—Mr. Henry D. Spencer

Treasurer—Mr. Karl W. Greene

The secretary was instructed to cast a single ballot for the above named candidates and they were declared elected.

THE CHAIR announced the personnel of the resolutions committee, as follows: Mr. Spencer. Mr. Neilson, Mr. Walker.

Mr. John W. Hershey of Downingtown, Pennsylvania, addressed the meeting on "Nut Culture", with lantern slides.

Mr. Hershey: As far as we can find from past history nuts were eaten by primitive men for thousands of years before they started to eat other proteids. Worthington Smith informs us that primitive man lived on nuts, and Wells says "nuts as a proteid were eaten for centuries before milk and eggs". Professor Elliott said it was thousands of years later before man learned to eat meat as a food.

In Bible history the first instructions given to man regarding food to eat are in Gen. 1:29: "And God said, Behold I have given you every herb bearing seed which is upon the face of all the earth, and every tree in the which is the fruit of a tree bearing seed; to you it shall be for meat." The Mosaic law, the law that has been a standard for all civilized nations to base their code on, states in Deut. 20:19, that in besieging a city "Thou shalt not destroy the trees thereof by forcing an axe against them, for thou mayest eat of them and shall not cut them down, for the tree of the field is man's life." In the next verse it states, "Only the trees which thou knowest that they be not for meat thou shalt destroy and cut."

Picture any city, any countryside without trees, then figure what we would be if we did not have any trees for utility purposes, and you will realize that the tree of the field is man's life.

The first and most prominent nut we have is the English walnut.

It comes originally from the mountains of northwestern India and Persia. It spread east into China. It spread into Greece by gifts from royalties in Persia, and was there thought so much of that it was called "Food of the God Jupiter." From there it spread into Rome and was called the "Royal nut." Rome spread the nut on into France by invasions into that country and it was there popularly known as the "Gaul nut." From there it was spread into Britain by the Roman armies and was known as the walnut, which is the English corruption of Gaul nut.

This picture is a garden in Italy. I want to bring out the utility in the picture. Here is the English walnut, here the grapes, and they grow also citrous fruits and peaches, all in the same patch of ground.

Here is a picture of a small family group in France sorting their English walnuts and getting them ready for bleaching in the sulphur vat.

This is their outdoor drying yard. They have a great deal of trouble with this method in damp weather to get the nuts dry enough to keep them from moulding in storage.

Dehydrating is coming into use in France very rapidly. In 1923 only 9% was dehydrated; in 1926, 35% was dried that way.

Here is an English walnut tree 200 years old and the timber is valued at about $150. You often have the question asked: "Does it pay to plant nut trees?" A hundred thousand such trees worth $100 each would make a nice investment to hand on to posterity! Sometime ago I met an old nut candy maker, 74 years old, in Philadelphia. After I had introduced myself, he expressed himself as follows: "Hershey, would you like to be worth a million dollars at 75?" I said I would be very much interested. He replied: "Go out and buy 500 acres of land, and plant it in black walnuts and I guarantee you will be worth one million dollars at 75."

Pomeroy's English walnuts grow in Lockport, New York. He owns the orchard that his father set out a good many years ago. He got the seed in Philadelphia and it is now a really profitable orchard. He has sold as high as 2,000 pounds of nuts per year from the orchard. He gets 40 to 50 cents a pound right off the lawn. You can see there the nice sized trees. The picture was taken when they were seventeen years old.

This is an Alpine tree in J. F. Jones' test orchard in Lancaster, Pennsylvania. It had four heaped half-bushel baskets at ten years old.

This is the late John G. Rush who was instrumental in getting Mr. Jones to come from Florida to solve nut problems. That tree had three bushels of nuts on it at eleven years of age.

This is a close-up view of a limb of one of his English walnuts standing between two stone drives with concrete wall on each side, five years old, well-loaded with nuts.

This is a seedling standing at Bally, Pennsylvania, 25 miles northwest of Philadelphia. It is one of the most beautiful English walnut trees I have ever seen in my life. It has been bearing since 15 years old. Seven bushels of nuts.

This is a seedling orchard of 120 trees, twelve years old, in Allentown, Pennsylvania, on General Trexell's place, who has 10,000 acres of land.

This is a picture in California. The California climate seems to be very well adapted to English walnut culture. In 1867 the first grove was planted. It took twenty more years before people became very much interested and then the propagated tree proved to be so much more successful than the seedling that the seedling was discarded and old groves were worked over. This grove is interesting in considering the question of how far apart to plant your trees. These were planted 40 x 40 feet apart and at 40 years of age bore fifteen hundred pounds to the acre. They cut out every other row, leaving them 40 x 80, and in four years they ran 3,000 pounds of nuts to the acre.

This is a thirty-five year old grove, a most beautiful sight, but only bearing partial crops because they are so crowded that they don't grow enough wood on which to develop nuts.

This is a long pole with a hook on the end which is used to shake off the nuts. They go around the tree with this and hook it into the limbs, which is an economical way to shake them down. After this they are gathered up in bags and taken into the drying and washing shed. I was given an idea the other day about gathering nuts after lecturing before a Rotary Club. A man told me he was from Oklahoma and was in business there growing pecans with a partner. This partner conceived the idea of taking a big canvas and putting it on legs under the tree. There was an opening near the centre of it along-

side of a central hole to fit the trunk of the tree, with a lace adjustment in order that the canvas could be fitted to any size tree trunk. Then a barrel was set under the funnel opening. You shook your nuts on the canvas and when the barrel was full you took it away and rolled another in.

This is Mr. J. F. Jones with a three-year-old Faust heart nut tree. I forget how many clusters of nuts there are, but quite a bunch. That is a wonderful picture of Mr. Jones alongside some of his scientific work. This is his little daughter with a two-year-old butternut tree.

This is a two-year-old Stabler black walnut. It has been my experience that a four or five foot tree makes a much nicer tree to plant than a smaller one. That tree is much larger than a tree of the same age only two or three feet high when planted would be.

This is a 5-year-old Stabler standing in Mr. Littlepage's place at Bowie, Maryland. Mr. Littlepage has planted about 125 of these trees and they are doing nicely.

This is a 7-year-old Stabler standing in the corner of his barnyard and is as large as his 8-year-old trees and 9-year-old trees where they are not so well fed.

This is a row of Stablers stretched out across his farm for a long way, and it is the most beautiful setting you can imagine.

This is a picture of the Ohio variety of black walnut. This is Mr. Jones and his 10-year-old Ohio, which is loaded with nuts.

This is an Ohio on Dr. J. Russell Smith's place, standing on his fence row among the rocks and stones of the Virginia mountains. It seems to be doing very well. About eight years old.

This comes from Ithaca, New York, 124 nuts, six years old.

This is one of Dr. J. Russell Smith's Ohio showings, one nut the second year after budding.

This is the Thomas variety of black walnut, taken at the West Town Quaker Schools near Philadelphia. We must admire the West Town people for having the initiative to do experimental planting. They have an extensive orchard of apples, cherries and peaches and they decided to try out a few nuts. They set out 36 Thomas and interplanted them with apples. At five years of age the apple trees are only half as large as the nut trees. Those trees bore from 109 to 135 nuts each which were sold for 20c a pound, but the apple trees bore nothing.

This shows Dr. Baum and his orchard at Boyertown, Pa. He has 1200 black walnut trees. This is the largest, improved, grafted, walnut orchard in the United States.

This is at Lima, near Media, about 15 miles from Philadelphia, on a lawyer's place who has put out about 50 black walnuts. One has 12 nuts on the third year.

This Thomas comes from Ithaca, 16 nuts on the third year.

Mr. Neilson: The horticultural experiment station at Vineland has a Ten Eyck black walnut that bore 197 nuts the fourth season after planting.

Mr. Hershey: It is a big drawback to the nut industry that people think nut trees are slow in bearing. This tree is five months after grafting and it has two mature nuts on in the nursery. It is a Thomas.

This comes from Columbia, Missouri, on the agricultural experimental grounds. They top-worked a lot of trees all over their large farm and they used these twin trees as an experiment. They grafted this tree to a Stabler. The fifth year this trees is as large as the seedling alongside of it. Each of them bore a half bushel of nuts the fifth year.

This is a setting of black walnuts on a man's farm on the outskirts of Lancaster. He had the reputation among his neighbors and the boys of being a crank. He rode horseback and walked a lot over his place, and he would carry a pocketful of walnuts. Wherever he went he would make a hole with his cane and drop a walnut. His farm is now lined on both sides with black walnuts.

Next we have the pecan, which ranges from the mountains of Mexico up as far as Iowa and through the Mississippi valley. The farther north you get the hardier the species. Through the undying efforts of Mr. Jones we have varieties that are not only hardy here in the East but they bear some crops. They are very ornamental, make fine shade trees, and they bear nuts. You might say, "Well, if they are only going to bear some nuts what is the use of bothering with them?" Well, the maple and elm don't bear anything. Another virtue of pecans is their deep rooting. You can grow grass right up to them.

This is a wealthy coal miner near Philadelphia. He proved his intelligence from my viewpoint by planting nut trees along his drive

three years ago. Two weeks ago I drove in and I saw two nuts. He told me he valued them at $100 a piece.

This is a test orchard of J. F. Jones of Lancaster, Pennsylvania. Here the pecan trees are set too close because he was not interested in production. At seven years of age they started to bear. At ten years of age two trees bore as much as 16 pounds. If they were standing on a lawn I think those 16 pounds would be better than a bare spot under a maple with a crop of dirt.

This is a setting 60 feet apart on Thomas Littlepage's place at Bowie, Maryland, twelve years old. They are making a nice growth but have not borne much yet, which he attributes to their being in a frost pocket.

Next we have the filbert. The American hazel is practically a worthless nut except a few varieties. I consider the most interesting and most desirable is the Rush hazel. It was located through the efforts of John G. Rush who found this bush, which is really an attractive, fair-sized and thin-shelled hazel. The filbert comes from Europe, is a thin-shelled, heavy bearing, large nut and was introduced into New York about 1880-1890. They got the idea they could make quite a profit in filbert orchards. Just about the time they were going strong the blight hit them and they all succumbed. Since then hardy varieties have been evolved to resist the blight, as far as we know, and they seem to be doing very well scattered over the country.

This is one of Jones's hybrids, between the European filbert and the American hazel. We layer one-year-old branches in June, weighting them down and covering them with soil, and then all the little shoots on the limbs sprout up and the main branch takes roots. Shoots of the same season we layer in August, and they are much easier to handle. They are not so rigid. The best result is obtained by covering them with a very thin layer of soil and then mulching. The filbert industry seems to be going strong in the Northwest, and I believe it is going to be a worth while proposition to plant filberts among standard walnut trees, or any nut trees here in the East.

This is a persimmon tree over in Dr. Morris's place at Stamford, Conn. That tree stands in heavy turf, yet at five years of age it is well loaded. It is my firm conviction that the persimmon is one of the future fruits of America. It is a sweet fruit. The tree is a heavy bearer and success is only a matter of getting people convinced that

there are good varieties, and getting the scientific men working to get better ones.

Mr. Neilson: There is a gentleman in Kitchener who got scions of the persimmon and grafted them on the plum tree. He told me he grew fruit and enjoyed it a great deal. It lived for several years, but finally died.

Question: What winter temperature would that tree stand?

Mr. Hershey: We get 10 to 15 degrees below zero.

This is a filbert hedge at Mr. Littlepage's. He gets lots of nuts off them. They make an excellent screen, and are very attractive. They bear a very peculiar cluster of nuts. The catkins hang on all winter. Then they bloom in the spring, very early before you think there is any plant life going. The female bloom is a very delicate red flower which, with the long catkins flying in the wind, is very beautiful.

All the hickories are American, although I understand there has been one found in China, which, however, is almost worthless as an edible nut.

There are about 15 varieties of the hickory in America and there are only a few of them that are worth while. The most likely ones are the shagbark, an eastern variety; the shellbark, a western variety, and the hybrids between them and the bitter nut, which itself is almost worthless to eat but makes an excellent parent. Some of the best hybrids are between the bitternut and the shagbark, and between the pecan and the shellbark.

There are two trees of the McCallister pecan shellbark hybrid in Delaware. As the parent tree died a few months ago these two trees are the only bearing trees in America and they have been bearing quite profitably. It was at one time thought that the McCallister hybrid would not fill, but these trees have proved on poor Delaware sand that they can fill their nut with delicious meat. The flavor of the kernel is very much like that of the shellbark. The nut is of enormous size, much larger than the largest pecan and has nearly as thin a shell as the pecan.

The hickory nut has been held in deep respect by mankind as far back as we can find on the American continent. The Indians used to gather them. The Creeks used to gather 100 bushels per family. They used to grind them into powder in the old fashioned mortar to a

creamy fluid. This is considered by some scientific men as of more value than cow's milk. Dr. Marsh tells us they used to let it ferment and they called the first drink "kiskitomas." What the second drink was called he said he did not know but it was powerful. The Indian name was "pawcohicora."

This starts in with my nursery work and will give you an idea of how we go about the business. We prepare the ground, mark out the rows and plant the nuts one by one in the fall. We then harrow the rows shut and try not to get the nuts too deep, because if you do they rot. So what we do is to plant them shallow and cover them up next spring. I planted them too deep this last year and had a fine failure. Mr. Jones planted shallow and had excellent results.

Here is a setting of seedlings taken, I think, the latter part of July, about up to the middle of your thigh or the hip. The three and a half to four feet wide rows have grown shut. A setting of about 12,000 trees. After growing them for a year we take them up, prune and transplant them. Get your rows wide enough or you will cuss when you are trying to prune.

After the trees are grafted the stock must be sprouted well. After the grafts have grown for some time with two or three shoots on them, the boys break off all but the strongest and straightest shoot.

We do not stake them until they get about two to three feet high. They come out rapidly and if we don't get them tied the wind very often breaks them off.

Here is a Thomas three and a half feet high grafted about four weeks. We have a lot of Thomas every year at the end of the season from six to eight feet high. Mr. Jones had some that grew as high as fifteen feet in one year.

We dig the trees and heel them right back in the row. I find one of the most disastrous things in heeling them in a trench is to get them packed too close and leave air spaces among the roots. We dig no trees for heeling in through the winter. They do so much better when dug immediately before shipping.

Here is a bunch of trees brought into the packing house to be heeled in to fill immediate orders. Now here is another thing that I think is of intense interest to the nut grower. Some years ago a man down at Berlin, Maryland, bought two Wiltz Mayettes from Mr. Jones. He planted the two. This one got a half bushel of eggs out

of an incubator. This one did not get any and is about four feet high. But this one that got the eggs is about twelve feet high.

Mr. Neilson: Is there the possibility of the larger growth being due to the stock as well as the fertilizer?

Mr. Hershey: I don't believe so. I have seen this so often that I don't believe there can be that much difference. But I believe it is all important to have the very best stocks. It is the duty of the nurseryman not to ship out inferior stock trees.

California produces about 48 million pounds of English walnuts. There is a large quantity produced in the Northwest. About 25 million pounds of pecans are produced in the South. A lot of filberts from the Northwest. Carloads of black walnuts from the middle and southern states. And yet we import about 30 million dollars' worth of nuts per year. It is my belief that in a decade we are going to have black walnuts grown in the East like pecans in the South and walnuts on the Pacific Coast. As soon as we have Hoover elected, we believe there is going to be an interesting change in the United States government. Mr. Hoover made a remark before a scientific body in Philadelphia a few years ago that he based all progress of the human race on pure science. Pure science is conducted by the man who gives his life to the job without any thought of remuneration. After he has brought his conclusions to the fore, practical science takes it up, and passes it on to industry. Mr. Hoover expressed the sentiment that it was so sad the United States government could not see its way clear to help pure science to develop. It is our hope that we will have a face-about program and pure science will be assisted by the agricultural department at Washington.

Mr. Gellatly of Westbank, B. C., showed slides of a number of trees in his part of the country.

PARAFINE WAX—AN AID TO GROWTH IN TRANSPLANTED TREES AND SHRUBS

By Jas. A. Neilson, B. S. A., M. S., Extension Horticulturist,

Dept. of Agriculture, Port Hope, Ont.

Amongst the varied problems that confront the horticulturist, that of getting newly planted trees to grow is one of the most common. This is particularly true of sweet cherry, roses, and nut trees, but also occurs with some other kinds. Nurserymen likewise experience difficulty in storing and transplanting trees or shrubs in good condition over long distances. These difficulties are due to various factors, but the principal one is believed to be drying out of roots and trunks which takes place between the time of digging and re-planting. Root drying may be prevented in the nursery by protecting the roots while in storage and by careful packing for shipment, and the planters likewise can do their part by careful heeling in until ready to plant. It is not so easy, however, to prevent drying out of tops in storage or transit without undue expense or trouble, and consequently there is usually some loss due to this factor when trees are shipped long distances.

Believing that some form of protection for the trunks and branches would be helpful in shipping trees to distant points, and in getting newly transplanted trees to grow, the writer conducted an experiment to determine the value of parafine wax as one form of protection. The use of parafine wax was suggested by the good results secured in sending scions to distant points and in storing rare varieties of nut tree scions for long periods of time.

Experiments which illustrate these points are described hereunder. On October 16th, 1925, a fine young grafted heartnut tree was blown down by a heavy wind and, in the ordinary course of events, would have been lost had not an attempt been made to save the tree by novel methods. The trunk and branches were cut into sections of about one foot in length and these sections were entirely coated with hot parafine wax. The waxed sections were then packed in moist sawdust and

stored in a cool place. During the winter the package containing the scions was inadvertently taken out and left in the open where it was fully exposed to the action of wind and frost for nearly three weeks. The package when found was returned to the store house and left there until spring. On May 14th, 1926, the scions were unpacked and grafted or budded on suitable stocks of seedling Japan walnuts. Quite unexpectedly a fair percentage of scions and buds started and grew well, and thus this rare variety was saved from destruction.

Equally good results were obtained in shipping waxed walnut scions from Canada to England, and in transporting scion wood of fruit and nut trees from Poland to Canada. These latter, by the way, were cut early in the year and were carefully waxed according to the writer's directions before shipment. The scions arrived in Canada early in March and were held in storage until May 21 when they were grafted on native sweet chestnut stocks. Some of the chestnut scions were sent on to Gellatly Bros, in British Columbia and were there grafted on native sweet stocks. Observations made just recently in Ontario and British Columbia show a high percentage of scions growing, thus affording another proof of the value of parafine wax for preserving plant material.

It may be said that scions would keep well without wax for long periods of time in moist sawdust, but experience shows that this is not necessarily true. The moisture content and temperature of sawdust varies considerably, in some cases too much moisture is present or high temperatures occur and injury to the buds takes place, while in others the sawdust may become too dry and the scions suffer by dessication.

In the tree planting experiment a number of heartnut trees were dug and the roots packed in sphagnum moss. The trunks were then coated with a thin film of hot parafine wax and the trees despatched for planting. After being on the way for several days the trees were planted and according to observations and reports have all started to grow.

Another interesting point showing the value of wax was seen on some of the waxed trees. On a few of the trees a section several inches long was purposely left unwaxed and on these sections the buds were

much slower in coming out than on the waxed areas. The unwaxed trees were likewise slower in starting into growth and fewer buds developed into shoots than was the case with the waxed trees.

In further and more definite support of the theory that parafine wax is useful as an aid in getting newly planted trees to grow, an interesting point was noticed in an orchard of apple trees owned by E. V. Atkinson, of Whitby, Ont. In this orchard there were thirty-six apple trees and two mulberry trees which had been planted on May 10, 1928. The results of this planting were not very satisfactory, in that the mulberry trees and at least ten apple trees had failed to grow when my attention was directed to them during the latter part of June. The trees were carefully examined and were found to be badly dried out and sick looking. The owner was advised to try the effect of a coating of hot parafine wax on the trunks and main branches of these trees. He acted on this advice and to the surprise of all concerned, the dormant trees started into growth and have since grown very well.

Whilst engaged in applying the wax, two of the trees were missed and this oversight was not noticed until about July 21st. One of these dried out trees was then coated with wax and the other left for comparison. The late waxed tree, like the others that had been previously waxed, came out into leaf and has made fair growth, while the unwaxed tree made very little growth and is only just existing.

An interesting example of the effect of parowax on roses was observed on the property of Dr. J. M. Baldwin, of Bowmanville. Early in May, Dr. Baldwin planted a number of rose bushes which had been received in rather poor condition. From observations made on the effect of parafine wax in protecting scions, Dr. Baldwin decided to experiment with parowax on his rose bushes. Two of the plants were waxed and one left for comparison. The waxed bushes came out into leaf nicely and the unwaxed bush, like the unwaxed apple trees, made very little growth. The number of rosebushes under observation is rather small, but the results were very good and thus indicate what might be expected with a larger number of plants under similar conditions.

The observations on walnut and fruit trees have been limited to

about 50 waxed trees and 25 trees without wax for comparison. Inasmuch as the number of trees under test is rather small, it is perhaps too early to say positively that parafine wax should be generally used for this purpose. The results, however, were so good on the trees and bushes under observation that it would seem desirable to experiment further along this line.

In the case of the preservation of walnut scions, and with experiments in topworking and propagating fruit and nut trees, it has been found that parafine wax is positively one of the most valuable protective materials used so far. The work done in grafting fruit and nut trees has been under way for several years and includes hundreds of trees. The results, moreover, have been so uniformly successful where parafine wax was used and so unsatisfactory without its use that one is justified in the above statement. In view of the favorable results noted above and of the good effect which followed the use of parafine wax on newly planted trees, it would appear that this material is of decided value in preventing dessication. The suggestion is therefore made that nurserymen at the time of digging try the effect of a thin coating of warm parafine to the trunks of trees or shrubs that are to be shipped long distances or which are difficult to transplant or carry over in storage. Fruit growers and others who plant deciduous trees or shrubs might also get better results by using parafine wax on plants that have not previously been waxed. The hot wax may be easily and quickly applied with a small paint brush after digging or before planting or one might plant the tree and apply the wax afterward. The cost of this treatment is very small indeed, being less than a cent a tree for the wax. In any case no injury is likely to occur and quite possibly good results would follow such treatment.

If further trials show that parafine wax has definite value for the purposes outlined above, it would be desirable to devise some means of quickly waxing the trees in nurseries. In all probability this could be done by means of a deep vat wherein the trunks and tops of small trees or shrubs could be dipped in the hot wax and quickly withdrawn. The optimum temperature of the wax has not been definitely ascertained, but it is known that woody plant material can stand without injury a temperature of 160 degrees F. It must be clearly under-

stood that the trees should be immersed only for a moment—just dipped in the wax and then quickly withdrawn.

I have been talking over this experiment with a number of people and I have found a great deal of interest. I felt rather pleased with the result so I thought I would try and get the benefit of the experience of other people. I sent a copy of another article along the same lines as this one to a number of my friends in this country and the United States and I received many valuable replies. To my great surprise I found it was a new idea. It may not be new to some of you but it was new to the folks who replied to my letter. In talking over the possibilities of the application of this idea to nursery practice one nurseryman told me that he thought it would be a very good plan for him to follow and had he known the possibilities of parafine wax to keep his rose plants in better condition he could have saved his firm $1000 last spring.

We have worked out a system of budding over old grafted sweet cherry trees in which parafine is used as the most important protecting material. I started pruning sweet cherry trees with a great deal of faith and little experience and ended up with little faith and more experience. I studied the failures carefully and came to the conclusion that they were due to lack of protection. I changed my methods and the principal change I made was the use of parafine wax as a coating to my scions and to the buds and the next year I got excellent results. I got 90% success in comparison to 90% failure the year before.

Mr. Gellatly: I have shipped waxed scions successfully to Pekin, China. I like a mixture of parafine wax. The wax alone cracks and leaves fissures through which the moisture escapes.

Mr. G. H. Corsan: If you drop into the old soldiers' home at Dayton, Ohio, you will see one of those fern leaf beeches on which the nuts are fat. Not far from there is the red leaf beech, which also had some nuts on it.

Near Port Carling I saw a beech tree that had very large nuts on, twice the size of the average. I looked over in the yard and I saw that the tree was in a pig pen. In a sandy section in the east end

of Toronto I happened to see an enormous crop of large nuts on a beech tree. I also looked over in this yard and I found there that this tree was in a pig pen.

Mr. Neilson: I believe, Mr. Bixby, that you have opened up one of the most important fields of work in nut culture. It will take a long time to get definite results but to my mind it is a most important and much needed line of work, and I sincerely hope you will be able to graft that idea on to the pocketbook of some of our very wealthy men, whether on this side of the line or in the U. S. I agree with you that the investment would yield dividends.

Some of you will undoubtedly be interested to learn that a start has been made along the lines of a nut arboretum in Canada. The Welland Ship Canal has 5500 acres of unused land along the right of way. They have decided to plant the major part of that in trees and they are going to feature nut trees. They have already made a very good start in getting seedlings of our very good varieties from the Niagara district and from other parts of Ontario. I believe they have about 29,000 seedlings of nut trees of different kinds that they are going to plant out in the very near future.

Mr. Pratt, Boys' Training School, Bowmanville: I have been greatly interested in this question of the opening up of a nut arboretum, particularly so as we have a sort of nucleus of an arboretum at Bowmanville. The government has set aside 50 acres to be used for arboretum purposes and the Toronto Horticultural Association is interesting itself in securing trees and shrubs for that land. It has occurred to me that the use of nut trees would very well work in with that scheme. Professor Neilson has done more than anyone else in Ontario to further the interest of nut culture. I would like to see some move made to establish an arboretum on a large scale. It seems to me that if people could come and see nut trees growing it would increase their interest in that subject in this province. We have the land there and a large number of boys to take care of the trees, and if there is any possibility of starting a project of that kind we would be glad to co-operate with you.

Dr. J. Russell Smith: I would just like to say a few words

with reference to a matter touched upon by Mr. Hershey, namely the utilization of nuts. I think it has possibilities that are very rarely appreciated. For instance the hickory nut. Here was this Indian practice of mashing up the nuts, boiling them, and letting the oil rise to the surface forming an emulsion which Dr. Morris in his book describes as richer than cream. This might well pave the way to a modern industry. Perhaps hickory nuts have enough fat to produce an oil as substitute for olive oil, equally as good and less costly.

The President: I procured a book of nut recipes gotten out by Elam G. Hess of Mannheim, and I persuaded Mrs. Bixby to take the time and trouble to try some of them. They were tasty and such concentrated food that while she thought she made only enough for one meal she had made enough for two. However she said that no modern housewife is going to continue to use nuts if she has to take so much trouble to prepare them, while if she gets a pound of steak she can broil it in a few minutes. Mrs. Bixby had spent all morning getting these nuts ready. It may be brought out tomorrow that other people have thought of that too. One grower is experimenting with a dish which is to be made out of nuts, and be canned and put on the market. I believe that one of the important things is going to be not only raising the nuts but marketing them in a form that will be handy for the housewife to use.

Dr. Russell Smith: If you would look back over the proceedings of this organization some eight or nine years you would find the statement of our Chinese member from the Kinsan Arboretum, Shanghai, that the common food for the Chinese baby whose mother can't nourish it is the milk made from grinding up the meats of the Chinese walnut.

Mr. Neilson: I am gratified that Mr. Pratt has invited co-operation in establishing a nut arboretum at Bowmanville. I am quite sure the soil and climate there are suitable for the founding of a nut arboretum. So far as lies in my means I will do my best to send you trees. I did send a small lot of grafted heart nut trees from the largest tree in this country.

Mr. Pratt: They are doing very well. They started off with two or three nuts on but they dropped off.

Mr. Neilson: I am quite sure that future generations will ap-

preciate the work that Mr. Bixby is so much interested in, and the work that we all hope he will succeed in starting in the United States and in this country as well.

Dr. Russell Smith: The last speaker spoke of the work of Mr. Bixby as the work of the future. He has four or five acres of trees at this moment on which he is spending thousands of dollars.

A Member: That is not speaking strongly enough of the work that Mr. Bixby is doing.

Upon motion the afternoon session adjourned at 5:30.

Evening Session, Monday

Invitations were presented from Springfield, Mass., New York, Philadelphia, Memphis, Tenn., Chicago and Detroit.

It was voted that the next convention be held in New York City on September 12, 13 and 14, 1929, and that the details of the convention be left to the executive committee.

Mr. C. F. Walker presented the following resolution in writing: "A motion is herewith presented to clarify the matter of annual dues and to change the first sentence of Article II of the By-Laws to read as follows: 'Annual members shall pay five dollars annually to include one year's subscription to the American Nut Journal, or three dollars and fifty cents not including subscription to the Nut Journal." Motion duly seconded and carried.

Mr. Spencer moved that the president ask Mr. Corsan to have Dr. J. H. Kellogg present his proposition for nut prizes in writing so that the members may know the exact conditions under which he wishes the contest conducted. Seconded by Senator Penny and carried.

Mr. Frey moved that it be the sense of this association that an annual nut contest be conducted with the aid of members or outside parties which may be secured, such contests to start not later than 1929 under arrangements to be formulated by the executive committee. Seconded by Mr. Greene and carried.

On motion made by Mr. Weber, seconded by Senator Penny, the convention elected the following board of directors, of which the president should be chairman: Willard G. Bixby, S. W. Snyder, Dr. W. C. Deming, James A. Neilson, Henry D. Spencer and Karl W. Greene.

Meeting adjourned.

Tuesday Morning Session

GROWING NUTS WITHOUT CULTIVATION

By Dr. J. Russell Smith, Pennsylvania

Truism No. 1. If a tree is well and thoroughly cultivated, it will grow more rapidly, bear fruit more frequently and more abundantly than if it is not cultivated, at least this is true in the majority of cases.

This well-known fact has been dinned into the ears of the agricultural public until sometimes it takes the form in people's minds that cultivation (stirring of the soil) is not only a necessity but also the only route to profits with any kind of crop tree.

I submit that it is not always necessary; not always profitable; that it may be ruinous to some hill lands; and that there may be a profitable nut industry without cultivation where nut trees cultivated in the ordinary way would be unprofitable.

The truism about cultivation needs to be considered with other truisms equally sound.

Truism No. 2. Agricultural profits result when costs are less than income.

Truism No. 3. Agricultural costs are often complicated to determine. They are rarely known with any approach to exactness. They depend largely upon the abstruse element of overhead expense, and the amount of this, per unit of product, depends upon the whole year's work and the organization of the farm, its crops, and the work plan.

Truism No. 4. Continuous use of equipment reduces cost. For example, a reaper costs about twenty-five dollars a year in interest, depreciation, and shelter. So does a wagon. If the reaper is used three days per year the capital cost is $8.33 per day. The wagon is used 100 days at a capital cost of 25 cents per day. And so it goes all the way through the farm. I am talking about *nut trees, cultivation*

and farm management. Some desk artists omit a large part of the problem.

The real question about cultivating nut trees is: Will the net returns of the process be better with cultivation or with some substitute method of giving the trees essentially similar benefits?

There is much excellent practice in both Enrope and America that tends to disprove the universality of the rule "Cultivate trees for profits."

For example, much the greater part of the Persian walnut crop of France and of Switzerland is grown on scattered trees along the roadsides and fence rows, or field edges which in America would be fence rows. Many stand out in the fields and get what the field gets. The trees sometimes get some cultivation as the adjacent land, or adjacent crop, is tilled and sometimes they do not, but they make a crop worth many millions of dollars in the aggregate, and the tree has cost but little because it had no item of overhead expense.

American experience is also suggestive. Is there nothing to be learned from the fact that millions of wild American black walnut trees and hickory trees are growing and bearing big crops in a great variety of fields, fence rows and roadsides?

Twenty-five years ago the horticultural doctors were announcing with sonorous authority that apple trees had to be cultivated to produce good crops. As a matter of fact, the present practice of many large, successful growers proves that in many parts of the eastern United States all the cultivation an apple orchard needs to produce more than the market will take is a mowing machine to keep down the grass and weeds, and a liberal application of chemicals to feed the trees. Feed the trees. Don't forget the word *Feed* when cultivation is in mind.

I own apple trees that were planted out in stump land that has never yet been plowed. The trees have grown to the capacity of several barrels per tree and borne many crops. Their only treatment has been keeping down brush and weeds with one scythe mowing per year, piling the trash around the tree when it was little, and fertilizing it every year. Again I emphasize, this depends on *feeding.* The use

of nitrate of soda has revolutionized the apple business on the clay hill lands of Virginia, Ohio, and other American states. I have also proved many times that grass will kill a young apple tree if it gets the chance.

Cultivation is merely one form of feeding. There are others. The facts of farm management raise a very great argument against the desirability of cultivating any additional crop on most farms in the eastern part of the United States. This is true, *because the cultivation period is already full of labor.*

Cultivation comes chiefly during April, May, June and July. At this time there is an absolute crush of labor on most eastern farms, such, for example, as the livestock farm which grows corn, oats, or wheat and clover, or alfalfa, or the truck farm, or the fruit farm. They are all already overloaded with work and the new nut crop has unfortunate competition to meet. Every summer on my farm I see many things I would like to have done. They are things that I think would pay; things that I would be glad to pay for. But the men and the equipment are not to be had at that time and place. A thoughtful man once remarked to me that plowing corn was sometimes worth twenty-five dollars a day and I believe he was right, in that a farmer would lose that much if he did not do it that day.

The Object of Cultivation

The object of cultivation is to cut down rival plants, thereby leaving more food and moisture for the desired crop plants.

The same results can be obtained in some situations by mulching the tree when little, by applying chemical fertilizers all the time, and by making water pockets to catch rainfall and increase the moisture supply.

I have applied all these things in a small way which promises success to the trees and which also fits into farm management, permitting something to be done which could not otherwise be done. That is the big point.

I have a blue grass pasture field on a farm that is now rented to

a dairyman. The field is reasonably fertile but very steep, so steep that cultivation would promptly result in ruin by gullying. This field was last plowed in 1895 and it should remain forever in good pasture or forest. I want to get it set to grafted black walnut trees. I have planted some ten acres of it to such trees while it still continues as a pasture. Some of these trees were raised in my private nursery until they were high enough to be out of the cows' reach. Others, smaller, had to have their tops protected by a rail pen, composed of twelve pieces of wood. The trees were mulched with straw and strawy manure. They were fertilized with nitrate of soda and this year I tried some bone meal.

This year also I have added shower irrigation. The trees have had holes dug near them and above them. These holes hold one or two bushels of water. Small trenches were made in a V shape above the tree to lead running rain water into these holes. Thus, every shower which made water run off the field caused the water to collect in the holes by the trees and irrigate them. I submit that this practice goes a long way toward replacing the water that cultivation might leave there.

The result of this combination of devices seems to be satisfactory. The trees are growing and the field continues to be a pasture. The trees would have grown faster with cultivation but a few of them are bearing a few nuts in their fourth season, a season in which nut trees in the neighborhood are not doing much.

I wish to emphasize the advantages of this system as *a piece of farm economy*. The factor that kills so many farm enterprises is overhead expense. The farmer buys a reaper which costs him twenty-five or thirty dollars a year to keep, in addition to repairs and labor use, and he uses it two days. That situation is typical of agriculture. It does much to explain the rapid disappearance of one crop agriculture. I own no tools in connection with this bluegrass-pasture-walnut-orchard, except 2 picks and 2 shovels. The orchard has been put in during odd times of the horses, harness, wagons, pitchforks and nearby farm labor. The straw mulch and manure have been hauled into position when the farm did not require the use of its team, which I hired by the day. The tenant held the overhead expense on the

team and he cut down his own overhead by working for me. The work of building the pens and of planting the trees has been done by farm day laborers of the vicinity at times when the local farm crops did not make pressure upon the labor supply. There are many, many weeks each year in that vicinity when I could not have got that labor for any reasonable money and love would probably have done no better.

In the meantime it should be remembered that the field continues to be the cow pasture, on a rented dairy farm. Therefore the nut trees can not be charged with any cost of interest on the land.

This advantage of getting the substitutes for cultivation attended to for the nut trees at a season when cultivation of other crops does no call for team, equipment, and men, is an important matter that has been too much overlooked.

This same piece of philosophy, namely, efficient utilization of the farm plant, promises to make the marketing of black walnuts another great advantage in farm economics; namely, an odd-time job for rainy days and winter weather.

A part of the above-mentioned field was planted to pecans by processes that were identical in every respect, except that the pecans were given the lowlands, the walnuts the hills. I might say that in this hill-pasture-walnut orchard I am merely trying to attain what has been attained in one of the most successful nut farms in the northern states of the United States of America—the E. A. Riehl orchard of chestnuts and black walnuts at Godfrey, Illinois, is on the Mississippi bluffs and other broken land that is so steep that plowing is unthinkable and climbing is difficult. The trees of course would bear more if they could be cultivated but they can not be and they are making crops and profit now.

The walnut and pecan trees of my planting were nursery trees transferred to a pastured field. The same philosophy of cultivation applies to the fence row tree. At the present time Nature has the habit in most of the eastern United States of raising a great abundance of hickories and walnuts, as well as many other kinds of trees, along fence rows. Millions of them creep up in these positions to a height

where they are safely out of reach of danger by pasturing animals. It is now an attainable task to graft these trees in place. It is easy to give them abundant supplies of manure, if available, or of lime, nitrate of soda, potash, or other chemicals thrown upon the surface of the ground near them, and of the raw bone dug in near their roots. I wish to emphasize the fact that a row of trees down the fence interferes with no farm machinery.

It is perhaps equally feasible to graft suckers of walnuts, hickories, and, in many places, of pecans, that grow up in the scrub of cut-over land. I think that such land can be changed from a wild thing to a grafted forest or open stand of grafted trees, either by letting it become a pasture or by letting it continue in the nature of a woods or thicket. If the latter course is followed, about the only care that is needed is to keep out the fire and cut down rival growth at some convenient season every few years. It would be a hard place to walk through but I suspect that the results would closely resemble tillage. As the grafted trees get larger and larger they will increasingly shade the suppressed growth beside them and take greater and greater possession of the light, air and root space.

I have not yet tackled the task of converting stump land without pasturing it but I have had some very satisfactory experience with a few scattered black walnuts grafted along fence rows and in rough pastures that can not be plowed. I have been particularly interested in a top-worked hickory, a sucker that grew up among many others in a pasture in which sheep, goats, cows, mules, by turns, or in common, have been doing their darnedest for about twenty years. This tree, a pignut, was grafted at a height of about six feet to Fairbanks hickory which is supposed to be a hybrid between bitternut and shagbark. The parent tree is native in Iowa and trees grafted from it are living in Vermont.

This particular tree has born fair crops of nuts for two or three years out of the last four years. I think the tree has been grafted about 10 years. It now measures 10 inches in girth at the graft. It has a spread of 10 feet. The top is about 8 feet in height above the graft.

The tree stands in one of the most unpromising places in three

hundred acres of Blue Ridge mountainside. Most of the soil on this slope is many feet in depth to bedrock but this place is about somewhere from two and a half to five feet deep; probably nearer two and a half.

I may say that this tree comes through with a crop this year when pecans, native black walnuts, and most of the nearby hickories are bearing little or no fruit. I have a sample with me.

Another Fairbanks grafted on a bitternut in an uncultivated field with deep earth bore some nuts on the third year after grafting.

My real point is that many land owners can keep on with their present farming, their present land, their present equipment, and add a nut crop with small additional cost. Income from this source will be in the nature of clear profit. That is the way the French do it and we are paying them millions of dollars a year for the nuts.

I should add in conclusion that the methods of cultivation that I have been talking about are those that can be applied only where something approaching personal interest is given to the trees. In other words, this is a story for the tree lover and for the land owner rather than for the tenant or the absent-treatment farmer, although I myself am an agriculturist of the partially absent-treatment variety.

Professor Neilson introduced Mr. J. Lockie Wilson, Superintendent, Ontario Horticultural Association, Department of Agriculture, Toronto.

Mr. Wilson: I am glad to meet so many of the delegates of the Northern Nut Growers Association and I wish to extend to you the hearty good wishes of the Ontario Department of Agriculture. We are working along similar lines with you in the department. We have a number of organizations that are encouraging the splendid work that you are doing. Mr. Neilson asked me to give you a short description of our horticultural association that is doing quite a lot of work for civic improvement in the Province of Ontario.

About 20 years ago we had a few hundred members, and today as Mr. Neilson has told you, we have a membership of some 80,000 paid members and some 300 branches scattered throughout Ontario. The

Ontario government gives a substantial grant to the horticultural societies in the province. Each branch gets a substantial grant, paid one-third on membership and two-thirds on their expenditures for horticultural purposes. The organization is spreading very rapidly and nearly every village and town throughout Ontario has its horticultural association. They were doing such good work for the cities that the Minister of Agriculture decided to extend the work to the farmers, and now we have rural horticultural societies. The membership they require is 25, each paying one dollar membership fee, and the Government gives them dollar for dollar per member. If a rural society has 75 members, their membership income is $75 and the Government gives them another $75, thus allowing them $150 to expend on their work.

Connected with my branch we have several specialists, one specialist an expert lecturer in horticulture who goes about in the province delivering addresses to those horticultural associations and assisting them to organize. I have had the honor and privilege of being connected with one of your large organizations in the United States and was vice-president of the American Civic Association for several years. I am still on the board. They are doing similar work to ours. For a number of years we met in Washington; last year in Boston. Their membership is much smaller than ours. They have a very small membership but they are doing splendid work for the citizens of the United States.

Mr. Neilson is the apostle who has spread the gospel of nut growing. In season and out of season he has discussed the value of utilizing nut trees in the different parts of this province.

I think that the work you are doing is of great value. We in our horticultural societies have devoted our time largely to the growing of flowers, but after all when you can encourage a citizenship in the growing of flowers, shrubs and trees around their homes, brightening the homes of our people, the work certainly is of great value. There was a time when many of our boys were inclined to leave the farms, but since the advent of the rural horticultural societies, when the boys become interested in brightening the farm homes, it helps this situation a great deal.

We have a number of organizations along similar lines. We have

the Fairs Association, an association of all the fall fairs exclusive of the Canadian National the Central and the Western, with a membership of 230,000, and that society is working in co-operation with the Horticultural Society in trying to make our country bright and beautiful.

Dr. Russell Smith replied appropriately, expressing the appreciation of the meeting for Mr. Wilson's address and paying the graceful compliment to Canada that to the United States she was a great asset in the nature of an example.

Mr. Greene: I think I ought to say in fairness to the speaker that I was enlightened by the magnitude of the work that his horticultural society was engaged in, and in that I see the reason for something that we remarked about when driving along the eastern borders of Ontario, and that is the continuous flower garden that we rode through.

The Chair: We are continually asked questions as to what is going to be the profit from nut trees, and it was determined to get information at this meeting from the few commercial orchards in existence as to what the returns had been.

Mr. Greene thereupon read a communication from Miss Amelia Riehl, of Godfrey, Illinois.

THE STORY OF THE OLDEST CHESTNUT GROVE IN ILLINOIS

Amelia Riehl, Godfrey, Illinois

In the year 1860 our father, E. A. Riehl, bought this piece of rough, hilly land. Only about one-third of it was fit for cultivation, the tops of the hills and the little valleys between them. These small pieces he gradually cleared and began growing various kinds of fruit which he shipped to the Chicago market. He was a pioneer by nature and was always the first one in the neighborhood to start growing a new product. When he saw that any one thing was being planted to excess he quit growing it and went to planting something else before the market became glutted.

He had gone to school in Pennsylvania where the chestnuts grew wild. In his early days here he planted a few trees so as to have chestnuts for his children. These trees grew and bore so well that about 40 years ago he got the idea of growing chestnuts for market. The largest of these old trees is now eight feet in circumference and has a spread of about 60 feet.

Then he began a search for the best chestnuts to be found anywhere. Wherever he heard of an especially good nut he tried to obtain a few nuts of it for seed and planted them. When the little trees came into bearing he made various crosses; always with the idea in mind of producing a new variety that would be as large as some of their foreign parents and as fine grained, sweet and delicately flavored as the little native American chestnut.

Hundreds of these little trees were grown, and planted in rough, uncultivated land that had never been plowed. As soon as they were large enough, the land was pastured. They were set much too close together for permanent planting. Each tree was allowed only enough space to be able to produce a few nuts. As fast as they came into bearing, and their nuts were tested, the poorest trees were either cut out to make room for others near them, or topworked to some of the better varieties. Out of many hundreds, probably thousands, of these

trees, about 20 of the most promising were given numbers and were watched very closely for several years. Six of them have proven so good that they were named and introduced as new varieties.

Father shipped his chestnuts to the same general commission house in Chicago that had handled his fruit. They very soon found these nuts to be superior to both the little eastern nuts, that are generally full of weevils, and the foreign chestnuts that are large but mostly coarse grained, with bitter pellicle. These chestnuts soon made a reputation for themselves. When imported chestnuts are selling for from 8 to 12 cts. per pound, ours sell for from 30 to 45 cts., where they are known. To illustrate: In the year 1926, when we realized that the crop was going to be unusually heavy, we thought perhaps the one commission house in Chicago that had always sold our nuts, could not handle them all to advantage. So we looked around for other markets. Mr. C. A. Reed, whom you all know, secured for us from the Bureau of Economics, addresses of several reliable dealers in half a dozen nearby cities. We picked out one name in each city and made a small shipment to that address. The nuts were immediately sold for the highest price on the list of market quotations, which was something like 12½ or 15 cts. per pound, when the same nuts were selling in Chicago, where they were known, for 30 cts. All to whom we shipped were greatly pleased with the nuts and wanted more. But they were terribly shocked when we told them what they should be getting for them. Gradually, as the buyers came back for more of "those good chestnuts", the commissioners asked more for them and two of them actually succeeded before the season was over in bringing the price up even higher than that which the old house in Chicago was getting.

We make it a point never to ship anything to more than one house in the same city. Then, when the buyers find that our product is good, they have to pay the price to get it. There is no chance of our competing against ourselves, as would be the case if the same thing were being sold in two houses. Of course, when one does that, he must have confidence in the men in his commission house. We are fortunate in having inherited our father's friends so we never have anything to worry about along that line.

Making a rough guess I would say we have about 15 acres of these steep, rocky hillsides with chestnuts growing in this half-wild state.

Naturally they would do a great deal better if grown in good soil and cultivated. But we find them a very profitable and the most reliable crop that we can grow here. They never fail. Looking through our father's account book I find there has been a steady increase in our crop, and the proceeds therefrom, over a period of eleven years. In the year 1916 our chestnuts sold for $122.00. In 1926 for $2,460.00. This from practically the same acreage. The increase is due to the greater age and size of the trees. Last year was an exception to the rule. Though the crop did not fail entirely it was only about one-third of what it was the previous year. This was caused by great floods of rain that continued all through the blossoming season and interfered with pollination.

The average price for Illinois grown chestnuts is around 30 cts. per pound. That is, they sell out of the commission houses for that price. The grower gets that much, less the commission and express.

Considering all points, I mean thriftiness of tree, earliness of bearing, productiveness, quality, etc., we like the Fuller variety best of all and would plant it more largely than any other. But we do not recommend planting any one variety alone, as chestnuts seem to need cross-pollination in order to bear abundantly. It is quite possible that our success with chestnuts is partly due to the fact that there are so many varieties growing together. Many of the original seedlings are still standing among the grafted trees. Thus we have a great variety of pollen. Any tree is likely to get pollen from some other variety blooming at the same time.

Chestnut trees come into profitable bearing about as early as do apple trees, with the same care and advantages. And the varieties vary as much in this respect as do the different varieties of apples. I have known a chestnut tree to bear and mature nuts seventeen months after the seed was planted. This, of course, is not the rule. The young trees usually bear from one to three pounds of nuts the third or fourth year from the graft, and double the crop the next year. So much depends on the location and other chances the tree has in this uneven land of ours, that it is hard to give statistics. It is impossible to calculate the average yield per tree.

It may not be out of place to give here the early history of the Boone variety. In the spring of 1895, Mr. Geo. W. Endicott, of Villa Ridge, Ill., fertilized blossoms of the Japan Giant with pollen of the

native American. The seed thus produced was planted in the spring of 1896 in rich garden soil. In the fall of 1897 one of the trees grown from these seeds developed six burrs filled with nuts. This was named Boone. It has borne annually since, the following amounts: 1 lb., 3 lbs., 5 lbs., 6 lbs., 8 lbs., 12 lbs., 17 lbs., 25 lbs., 31 lbs., 43 lbs., 50 lbs., 56 lbs., 5 lbs., 80 lbs., 76 lbs., 140 lbs. Since that time, Robert Endicott tells me, the tree has been bearing an average yearly crop of 150 pounds.

So far we have bought used sugar and feed sacks costing from 3 to 5 cts. apiece, in which to market our chestnuts, always using a double sack. Thus we can ship 100 lbs. in a container that costs from 6 to 10 cts. We are now considering the advisability of having special bags made and printed with our address. We believe in individualizing a product that is better than the average. And, it seems to us, we have developed our chestnut industry to the point where this would be an advantage.

We have always marketed our chestnuts as they were harvested, without storing them for any length of time. We have tried several different ways of storing them, but have found nothing that is practical on a large scale. They keep perfectly if put while fresh in an air-tight container, such as a glass jar or tin can, and stored in a cool place. Last April, Mr. C. W. Bricker, of Ladora, Iowa, sent me some Fuller nuts that he had gotten here two years ago and had kept all this time in a milk can. They were in perfect condition. Some of them had sprouted and when planted, went right on growing. I feel sure that chestnuts could be kept indefinitely in cold storage if not allowed to freeze. Mr. Reed did some experimenting along that line last year. I would like to know what he learned. The demand for chestnuts always lasts longer than our supply. I think we should make an effort to hold some of them for the Christmas holidays.

I do not remember how many chestnuts are imported into this country each year. But I do know that a goodly sum is spent for imported chestnuts. I can see no reason why all these nuts could not be grown in the United States and Canada, thus avoiding the possibility of bringing into the country more foreign pests.

We have great hopes for the chestnut industry in the Mid-west, where the chestnut is not native and where there are as yet very few weevils. If we had more land we would plant more chestnut trees.

THE E. A. RIEHL FARM

By George W. Gibbens, Godfrey, Illinois

Nursery Stock

Previously there has never been enough of grafted chestnut stock to supply the demand. Consequently we have enlarged our nursery department and can now furnish grafted chestnut trees of all of the leading kinds. We are giving our very best attention to the production of fine nursery stock true to name.

New Varieties

We are bringing out to public attention two new varieties of chestnuts, the "Dr. Van Fleet" and the "Gibbens". These each have excellent qualities. The latter is very early in ripening its fruit and will lengthen the nut season at least two weeks. It is a fine sweet nut of good size and color. We believe this variety will be of special value in the northern part where autumn frosts sometimes come early.

Chestnut Dish

Chestnuts, properly prepared and cooked, make an excellent table dish. We believe this product will be in demand when canned and placed on the market. A party, skilled in the business, will test this out for us.

Walnuts

We are just beginning a walnut nursery and will soon have a large supply of the well known kinds, as well as some of the newer varieties. In addition to grafted stock we have a good supply of Thomas seedlings. The best of these seedlings we hope to plant in an orchard and watch results for new varieties.

Experiments

We are testing out for worth and hardiness some of the leading kinds of hickory nuts, pecans, hickory and pecan hybrids, filberts, English walnuts, heart nuts, etc.

Experiment Farm

In addition to what we are doing here, I am planting my old

home farm (140 acres) in Pike Co., Illinois, to nut trees, seedling walnuts and chestnuts. I have about forty acres of it planted and hope to put out some each year until most of it is in nuts. My object is to test for new varieties as well as use for commercial purposes.

YIELDS OF INDIVIDUAL NUT TREES

Chestnuts at Riehl Farm near Alton, Illinois

Year	Yield	Sold for	Year	Yield	Sold for
1916	Lbs.	$ 122.16	1922	Lbs.	$1,196.81
1917		321.24	1923		1,410.72
1918		366.13	1924		1,327.53
1919		667.41	1925	6174 "	1,506.02
1920		1,199.54	1926	12988 "	2,460.04
1921		1,058.34			

American Nut Journal, March 1927 P43

Professor Lewis Edwin Theiss, Munsey, Penn.: What are the six main varieties that Miss Riehl has?

Mr. C. A. Reed: The Fuller, Champion, Progress, one that they have called a Parry for a number of years but that is not the true Parry. The Parrys of New Jersey put out the true Parry. A few years ago they put out a seedling of the Parry called Reliance. Then they have two new varieties, the Gibbens and the Van Fleet.

Miss Riehl referred to refrigeration work which was going on in the department of agriculture. We have found that chestnuts held at 32° F. would keep perfectly and germinate in the spring, but it is important that they be in good condition when placed in storage. There is a prejudice in the minds of the public and of commercial men against cold storage nuts for eating, but it is founded, we believe, on a wrong conception. The nuts must be in good condition when put in storage. We find very frequently that they are tainted before put in storage. Nuts that are partially broken down before they go into storage continue to go down in storage and go down more rapidly when they come out.

Mr. Green: It seems to me that, inasmuch as we print several hundred copies of the records of our meeting, things that will be of value as history or information in the work that we are trying to do, and especially of interest to people who join with us from this time

on it seems to me that those items that we can gather from any one place on any variety should be carefully recorded, and at Mr. Bixby's suggestion I would like to ask if there is anyone present who can give us the details, names and addresses of persons who have commercial yields, or yields that are perhaps not commercial but are interesting from an investigator's point of view as showing the possibilities of nut trees if planted commercially.

Mr. Bixby: The Year Book of the Department of Agriculture gives yields on Mr. Wilkinson's place as follows:

PECANS AT J. F. WILKINSON'S PLACE, ROCKPORT, IND.

		Busseron	Greenriver*	Indiana	Major
	Planted	1913	....	1913	1915
Yield	1920	5 lbs.	3 lbs.	lbs.	lbs.
"	1921	8 lbs.	2 lbs.	lbs.	lbs.
"	1922	30 lbs.	14 lbs.	6 lbs.	3 lbs.
"	1923	18 lbs.	7 lbs.	4 lbs.	11 lbs.
"	1924	25 lbs.	9 lbs.	7 lbs.	16 lbs.
"	1925	40 lbs.	17 lbs.	23 lbs.	22 lbs.
"	1926	86 lbs.	38 lbs.	62 lbs.	45 lbs

Year Book U. S. Dept. Agriculture 1927 P485

* The Greenriver tree was budded in 1915 and left in the nursery row. It bore a few nuts in 1917 and 1918 and 3 pounds in 1919.

You can see that there is an increase, which, though not perfectly regular, is consistent until it gets to quite sizable figures.

Mr. Weber: Of the trees that were permitted to grow in the old nursery, those in the centre which did not get as much light did not bear as much as those on the outside, which proves a tree should not be shaded by surrounding trees.

Mr. Spencer: At Farina, Illinois, there is a firm, Whitford Bros., who run a nursery in which they are raising chestnuts, pecans, hickories and walnuts to a limited extent. Their father some years ago planted some chestnut trees and two years ago I received a letter from them, when I was making a little investigation for local trees, in which they submitted that three and a half acres of chestnut trees planted by their father some 25 years ago had produced a crop which they sold in Chicago. Unfortunately they did not do as Miss Riehl did. They had two different brokers, one sold the crop at 35c per

pound, the other sold the crop at about 18c a pound. The average was about 23c a pound. The net value of the crop two years ago was $550.52 an acre. Last year, as Miss Riehl says in her letter about her own trees, the crop was not so large because we had excessive rains during blooming time and the pollen was washed away*. Illinois is

*WHITFORD NURSERY
Farina, Illinois
Sept. 28/28

Mr. Willard G. Bixby:

The amount of $552.50 is very nearly correct as the amount of gross receipts per acre from the 1926 chestnut crop on the old home farm. The crop from 125 old bearing trees was 7520 lbs., which sold at an average price of 23c per pound or $1729.60. Acreage 3⅛.

Crop 1927 due to the rainy and cold weather and poor pollination being 2700 lbs. but quality good and price 25c per lb. net.

Crop this year nearly as heavy as 1926 and nearly ready to harvest.

Our plantings here at Farina amount to nearly 3000 trees with an acreage of 100 acres. Young trees from one to three years of age and having a few nuts on this fall. We consider our soil very suitable if well drained. Our only trouble so far is the hot sun in summer and winter which scalds the trunks and burns the foliage causing a very small percent of loss.

A. M. Whitford

favored by the fact that the chestnut grows very rapidly there. There are a good many plantings. Mr. Endicott of Villa Ridge has a number. Over near Jacksonville, Illinois, is a party who has practically lived off a chestnut grove that he has. The chestnut grows very readily and up to the present time is free from blight. Through the activities of this association the Governor has instituted a quarantine against New York, Pennsylvania, and Virginia and the states along that line clear to the Atlantic Ocean, but Carolina, Kentucky and Tennessee were omitted and they and a good many more have slipped trees through and sold them. Over in Indiana a large orchard was caught and burnt just because some of that cheap stuff was shipped in.

While I am on my feet I just want to say one thing to the Canadian friends that are here. Like a great many other visitors we were charmed with the beauty of that reproduction of Niagara Falls in diamonds in the window of a leading jeweler. According to the card in the window that display was worth $250.000. Now that is just an exaggeration of extravagance. There is not a single solitary thing

in that window that is of any real use to the general public. But right over in that corner that display of nuts brought here from British Columbia by Mr. Gellatly and over here the display of the Horticultural Society of the Dominion of Canada, are worth ten times to Canada the entire display in the jeweller's window, because this will constantly increase in value, it will encourage everybody that makes any reasonable study of how to plant them, and it means a great big increase in the agricultural value of the crops of this country. I have a great deal of sympathy for the small boy who has to go down to the grocery store with a nickle or a dime for his nut party instead of going out to the woods, as he ought to be able to do if nut trees were encouraged.

Dr. J. Russell Smith: The figures that were just now given by the secretary for this chestnut grove at Farina, of about 2500 pounds per acre, are apparently in accord with the figures that I have obtained in the chestnut orchards of Europe.

Mr. Gellatly: In British Columbia, on the Fraser River, Gilchrest Bros. have five chestnut trees that return an annual crop worth $200.

Mr. Gage: Mr. Sylvester Kratz at Jordan Station, a short distance from Niagara Falls, has a Japanese Heart walnut which had 7½ bushels on it.

Mr. Neilson: The tree measured 63 ft. spread.

Mr. Gellatly: We have shipped green filberts to the Prairie market and they have yielded us 50c net per pound. I think it would be unfair to hold that up as a price than can be maintained. We get 25c a pound for the dried nuts locally.

Mr. Neilson: Would you get a higher rate for them green?

Mr. Gellatly: Yes, you get a higher price for the green nut, husk and all, than for the dried nut.

Mr. Frey: I might mention that green almonds are shipped from California in crates, similarly to the way cherries are shipped, and the Chicago market takes quite a lot of them.

Question: How far south-west is the heart nut or Japanese walnut grown?

Mr. Reed: It has been grown all over the South and West too. It was introduced into this country first by California and it came

from there East. In the South it has succeeded. It is subject to a peculiar disease, a sort of witch's broom or rosette. I know of an orchard in Georgia of 100 acres or more that was discontinued entirely because of the disease and the uncertain bearing habits. Those nuts came from the Parrys of New Jersey. There are no parts of the country where they have not been given a trial.

A member then asked for data on Canada, to which Mr. Neilson replied: The heart nut, seedling trees, has been grown without any injury at Ottawa. I have been told there was a heart nut tree in Montreal, but I cannot vouch for that statement. Mr. Gellatly has a lot of them in British Columbia. In Ontario the northernmost place where I have seen a heart nut tree is 25 miles north of the city of Oshawa. Oshawa is roughly 20 miles east of Toronto.

In the western part of the province I cannot say anything about it, but I know they have been growing up around Collingwood and Owen Sound on Georgian Bay. I have been told that seedlings from the heart nut have grown as far north as Haileybury and they stood four winters at least without any injury, then were destroyed by fire. I think the heart nut will grow, from information that I have, in this province in any place that the black walnut can grow. They grow away down east of Montreal and as far north as North Bay, which is about on a line with northern Lake Huron. I sent some heart nuts to the Manitoba Agricultural College and they were planted, but somehow or other the trees that came from that planting are not heart nuts, according to the foliage.

Mr. Gellatly: They were positively black walnuts. Bally River Nurseries in Manitoba have some heart nut trees growing there.

Mr. Neilson: In Bally River it gets 40 below zero in the winter.

Mr. Bixby: I have been informed that in England it is quite usual to eat the filbert green.

Question: Has it a different flavor?

Mr. Bixby: I have eaten plenty of them green from bushes, and they taste kind of green. It is not as pleasing to me as the dried nut.

NUT GROWING IN NORTHERN NORTH AMERICA

By C. A. Reed, Nut Culturist, United States Department of Agriculture, Washington, D. C.

We will begin with the slides immediately. I want to show you phases of the American nut industry in practically all parts of the country.

That is an almond orchard. We are not very much interested in almonds in the East for the reason that the almond is one of the most exacting in its climatic conditions of any commercial species that we grow in this country. It is a native of the Mediterranean region, as you know, and is an exceedingly early bloomer. It blooms along in January, February or March, and the blossoms are apt to be destroyed by subsequent freezes. For that reason the almond is not successful in the East.

Mr. J. F. Jones had, at the time of his death, an almond tree, a Nonpareil I believe, one of the standard California varieties. The Texas is not exactly a soft shell but nevertheless it is about as exacting in its climatic conditions as the other varieties. The almond is successful on the Pacific Coast, only, well away from the cold air blasts from the Pacific Ocean. There are occasional hard-shelled almonds, very beautiful bloomers that are satisfactory in the landscape but I have yet to see one that is really palatable.

This is one of the typical walnut views that you see in southern California. In 1900 in the United States we produced around 21 million pounds of nuts, walnuts, almonds and pecans. In 1910 we produced 39 millions, nearly twice that number. In 1920 the number jumped to 106 million pounds. The walnut is usually our medium crop. In 1926 the walnut tonnage dropped down to 30,000 tons. That year, the only time in history, we had more almonds than we had walnuts. We had 32,000 tons, 2,000 more than we had of walnuts. We had a phenomenal crop of pecans for that year, over 64 million pounds. The crop, this last year, of pecans dropped down to

22 million. This is an orchard of seedling trees. It was not until 1910, or thereabouts, that California really got to planting grafted trees. Probably 90 per cent of the production of walnuts today is from seedling trees. The exact origin of the parentage is not known but it is supposed to have been from South America. Strange to say we never had any important importations of varieties from South America.

This is an Oregon view, showing one of the errors that Mr. Hershey pointed out yesterday, that of too close planting, but it shows also their intensive cultivation. Their high cost of overhead is compelling experimental work along that line.

This is a view that some of you may have seen before, some of the California roadside black walnuts that were top-worked to standard varieties of the Persian walnut. It makes a beautiful picture, but so often there has to be something to take the joy out of life. If you would examine those trees closely you would find in every one of them a great deal of heart rot in the center. We are fearing that by this time (that picture was taken eight or ten years ago) those trees have come down by reason of that heart rot. It does not pay to make cuts more than 3 in. across if you can possibly avoid it. Branches 2 in. in diameter are as large as should be cut off if possible.

Merely a passing picture to show you how walnuts look. Mr. Hershey told you yesterday of yields of 1½ tons per acre. The average in California is around 800 lbs. or perhaps a little less. The better cared for orchards produce upwards of 2,000 to 3,000 pounds, which is very much more than has been realized in pecans in the South.

The Persian walnut was early planted in the East, and you and I have seen many beautiful specimens of trees over much of this country. There are some in the Niagara peninsula, many in Western New York. They are all through eastern Pennsylvania, down through the coastal plain section of Delaware and New Jersey, eastern Maryland and even Virginia. They are planted farther south, but they do not survive. In fact, none of the walnuts, even the black or the Persian or the Japanese walnut, seems to be long-lived in the plain sections of the South. In Louisiana, where there are parts of the state that are quite

rolling, the black walnut does quite well on the uplands, but by the time it gets to be 25 or 30 years old in the plain section, the trees succumb.

This is one of the trees in Georgetown, a part of Washington. You may recognize Mr. Littlepage under one of the trees. The trees in Washington are extremely variable in their bearing capability and in their ability to survive. You will find records of at least a dozen that have passed off for one that has survived. A number of experimenters recently have been working with lime on the theory that the Persian walnut is an alkali-soil requiring species. There is a good deal of evidence in support of that theory. All the walnuts in California are grown in alkali soil. In the East, Mr. Jones told us once that he found in an acid soil the Persian would pass out. Mr. Littlepage showed me two trees recently that he limed early this spring, trees that were ten years old and three feet high. He told his man to put on all the lime they could; he did not care if he killed them as they were not any good as they were. And this year they have a growth of four feet. Mr. Bixby has been studying along the same line, and he tells me he cannot account for the fact that Persian walnuts which he has at Baldwin have not done well, whereas they have done so in parts of the country where climatic conditions are very much more severe. Climatic conditions on Long Islnad are very much modified by the proximity to water on all sides.

There are a number of varieties that were propagated by Mr. Jones in the East and a good many of his trees are growing and will doubtless be heard from, one way or the other, sooner or later. We are not going to spend a great deal of time on this species but before we leave it I am going to tell you one thing that is of greatest interest to us all and that is that Mr. Jones, as you know, imported seed of walnuts from north China, grew the seedlings and sold them wholesale to a nursery man. In Michigan, not far from the Indiana state line, only a few miles north of Elkhardt, there is an engineer from Chicago who bought a farm of 300 acres as a summer place. That farm is between two small lakes which have such an influence on the climatic conditions there that he is able to grow such tender plants as roses which are not generally grown successfully in that part of the country. In a round-about way he acquired perhaps 100 or more of those

Chinese walnut trees from Mr. Jones. They were sold to him as Manchurian walnuts. I saw them two years ago planted in sod, not given special attention. He wrote to me two weeks ago that they were doing splendidly. That is up in northern Michigan where it gets down to 15 to 20 below zero.

Two years ago I made a trip about Michigan with Professor Gardiner, professor and director of horticulture in that state. He is an old schoolmate of mine. He heard me talking to one of the growers about the possibility of planting some Persian Walnuts, and made this statement: "Your Persian walnuts in Michigan are worth about 20% less than nothing." And yet we have in this picture Chinese walnuts that are making phenomenal growth on the place of a Chicago engineer, Mr. E. E. Bellow. He has seedling trees from two other sources, some from Rochester and some from Mr. Pomeroy of Lockport, more recently. He says that his Lockport trees which he planted this spring are doing well this summer. Mr. Littlepage invited me to make a trip through New Jersey. He was going to see a tree of the "Startling" apple. While we were going around this man's place who owns the apple tree, we came to a Persian walnut. He said it was a Pomeroy seedling. He had 50 at one time but they were so subject to winter and spring freezing that he could not raise them profitably. His land was worth much more to him to grow apples and peaches. There was a case where 50 well-cared-for walnut trees were pulled out because he found they did not pay. Climatic conditions were too severe, and that is one place in all the East, right there near Delaware bay and not so far from the Atlantic Ocean, where you would naturally suppose that walnuts should do as well as any place in the East.

Question: How do you explain the term "severity" in making trees fail in Delaware when they survive here?

Mr. Reed: Of course some of them survive there. That is a relative term and your term "survive here" is relative.

Questioner: I took you to mean they were not doing as well in Delaware as around Niagara.

Mr. Reed: I do not know of any trees around Niagara. There

is quite a story to the Pomeroy seedlings. Their Lockport orchard has performed more satisfactorily than any orchard I know of in the East. But neighbors around there tell me that trees which they have planted have succumbed. The only way I can account for it is that the Pomeroys hav a peculiarly favorable site to protect them from winter injury.

Mr. Neilson: About ten miles west of Toronto they have some Pomeroy seedlings and, while they are not producing regularly, they do bear from time to time. In 1902 they had a very good crop but I found this, that in most cases in this province where English walnuts are grown they are just about left to themselves. Comparatively few people give them any attention, with the result that they do not get the crops that they would if given particular attention.

Mr. Hershey: Don't you think that the fact that there is great variation in the seedlings helps to account for this difference?

Mr. Reed: Undoubtedly.

Mr. Neilson: Down near Vineland there is the oldest English walnut tree in Ontario. The present condition of that tree is not good. It is showing the effect of time but is still living and is about 100 years old. In this past year the present owner told me he got 14 bushels of nuts. The flavor of those nuts is not so good as some other strains but the fact that it produced that much in one season without any special attention is interesting. The original owner, who is a reliable person, is reported to have said that he got a crop of 30 bushels. That must have meant with the husks on. The present owner got 14 bushels with the husks off. It bears nearly every year.

Mr. Reed: As a result of a black walnut contest conducted by this association in 1926, a grower 18 miles from Boston, Mr. C. C. Geissler of Sharon, sent a few specimens of what he called a Russian walnut to Dr. Deming. As the committee was not passing on anything but black walnuts, these nuts were sent to Washington and we examined them. We found that while they were not what you would call high class, that is so far as freedom from tannic acid was concerned, they were very satisfactory for family use, and the very fact that they had been produced up there near Boston interested us extremely. I went

up there and examined the tree. It was 14 years old. It was one of two trees which had grown from nuts which Mr. Geissler had planted fourteen years before. He had obtained them in a sack which had been bought on the Boston market by the proprietor of the store where he is employed. They had been marked "Siberia." I have grave doubts whether those nuts were grown in Siberia. I talked to Dr. Yates Wilson about that and he confirmed my opinion that they were probably grown in China. They were typical Chinese nuts. It was a fine looking tree.

We will spend a few moments now with the pecan. In a way the pecan is our most important American grown nut. It is by far the most important of our native species. This is a photograph of the very largest pecan tree that we have on record. It measured 23 ft. in circumference at breast height when that photograph was taken, but it is understood that the tree was cut down soon after this picture was taken. It was struck by lightning. It was in east central Oklahoma. We know nothing about the bearing record. It was estimated to be about 170 ft. high which, according to Sargent, is as high as they grow. The largest living tree we have record of at the present time is in Louisiana. Those of you who attended the meeting at Easton last year saw and were photographed under what we think is now the largest pecan tree in the United States.

Near Easton there are a great many pecan trees like this. This is on one of the arms of Chesapeake Bay between Easton and the bay proper. They are all around there if you take the trouble to see them. This is southeast of St. Michaels.

This is a Louisiana seedling. It illustrates very perfectly the fact that the southern species can be taken very much farther north than their point of origin and grown successfully so far as the tree itself is concerned. It is another matter to get even occasional crops and still another matter to get paying crops. Dr. Deming took me to as fine a pecan tree as you can see, near Hartford, Conn. The pecan in that New England latitude is of very little use other than that of ornamentation.

Mr. Spencer: Not long ago I was talking with some people

about the size of the Easton pecan tree, and one of the gentlemen present spoke up and said it is not the oldest planted pecan tree in the United States, because up in Biotaseh the Acadians planted some when they came from Halifax, N. S. I asked him how they got pecans in Nova Scotia and he could not tell. Have you ever seen it?

Mr. Reed: No, I have not.

This is a picture in one of the orchards we have been hearing about. It is that of Mr. O. H. Casper near Anna, Ill., put out in 1917. They were grown by Mr. Littlepage in his nursery out in Indiana. It is a very interesting orchard. It is in semi-pasture. The mowing machine had been over it a few days before this picture was taken. These trees are growing thriftily and bearing some nuts. When I saw them last year they had an average of two or three nuts to the tree in the 12th year that they had been out.

This is a picture of the parent Busseron near Vincennes, Ind. The top had been cut back severely in order to get budding wood and stimulate new growth. The Busseron is one of the best known of our northern varieties; in fact we have only about eight altogether.

At this day we have little idea of some of the difficulties that the pioneers had. This is the trunk of the parent Green River in a forest some 15 miles from Evansville, Ind., on the Kentucky side. It was not this tree, but the Major which is very much like it which, according to Mr. Littlepage, measured 59 ft. to the first limbs, and the bud wood was from 75 to 100 ft. high. Mr. Littlepage, Ford Wilkinson and two or three others went to get some bud wood. They had written Mr. Jones about the height of these trees and the difficulty of getting wood. Mr. Jones wrote back: "If you will send to Sears, Roebuck & Co. and get a pair of their 15 ft. pruners you will have no difficulty in getting your scions. When it came time to climb these trees one man thought he could make it. He put on the spurs, went up 15, 25 feet and higher, got white in the face, came down and nearly fainted. After that Mr. Ford Wilkinson went up the tree to near the top. If it had not been for Mr. Wilkinson I don't know how we would have obtained the scions. The Green River is one of the latest maturing varieties and at Bowie it is quite frequently caught by fall frosts.

This may be the tree that was referred to yesterday as being in Shawneetown, Ill. Mr. Luccadoo of southern Indiana, like Mr. Wilkinson a professional pecan thresher, took the contract for gathering a crop and in one tree he found nuts very superior to the others. It was named in his honor.

This is a young tree of the Major. I have no photograph of the original tree. The Major is a very high class little nut, but Mr. Jones said once it was too small for his locality.

And this is the parent tree of the Niblack, named in honor of Mr. Mason J. Niblack who is shown in the foreground, who was with us at the meeting at St. Louis, but has since passed away.

This is the parent of the Norton pecan which is perhaps the most northern variety yet brought to attention. It has been propagated very little. Mr. Bixby has it. It is from near Clarksville, Mo. The Norton is a very choice nut but the tree itself is so inaccessible that we know very little of its bearing record. Mr. Norton has a seedling of the Norton which he regards as being superior to it, and we are inclined to agree with him.

This is a close up view of the Posey near Greyville, Ill. The Posey was regarded by Mr. Jones as being the most satisfactory of any variety that he had under test at Lancaster. It was a little better bearer and less subject to spring freezes.

This is a typical southern variety, the Sehley, about eight years old. This tree, however, was photographed last December in southeastern California. It has been planted a good deal in the Imperial Valley on the Arizona border and over in Arizona in the last few years.

We will spend a very few moments on the hickories. This is the parent tree of the Dennis shagbark from Cedar Rapids, discovered and named by the late Dr. Dennis of Cedar Rapids. A very excellent variety, but none of the shagbarks have been propagated to any extent. Mr. Jones, and also some years ago Mr. W. C. Reed said they have been so slow in growing and hard to propagate that they felt, as nursery men, they could not afford to propagate them.

This is the Kentucky tree grown by Mr. Littlepage. Mr. Bixby has it in bearing.

Now we come to the hybrids. This is the parent tree of the McCallister discovered many years ago, probably in the late 80's, by a Mr. Floyd, but the tree belonged to a Mr. McCallister. Mr. Floyd was of Missouri. He took scions south, and six trees, if I am not mistaken, were grafted on pecan and grown at Washington, Georgia. Later the variety came to the attention of the United States Department of Agriculture and the name McCallister was definitely fixed. Because of the enormous size of the nuts, the vigor of the parent tree and the fruitfulness, it attracted unusual attention. As a result a great many of the pioneer pecan men of the South developed trees by top-working pecans with the McCallister, but the only instance that has come to our attention in which they were satisfactorily fruitful in the South was in those six trees in Washington, Georgia. But nowhere in the South have they filled well. Over in Delaware, at Milford, there are two trees referred to by Mr. Hershey grafted, one on hickory and one on pecan, by a Mr. Corso. I saw those two trees the other day. I have seen a few nuts that were filled. The ones I saw were filled much better than the average of what we have seen in the South, or from this parent tree. It may prove to be worth more in the North than in the South.

It is rather unusual for oversized nuts to be dependable in filling quantity. Many years ago while Mr. Jones was a youngster in Missouri, he found a hybrid hickory in the northeastern corner of the state which became known as the Rockville.

About two weeks ago Dr. Smith wrote to us at Washington asking what we could tell him about the Cedar Rapids shagbark. Now there are two hickories that have been known by that name. One is a shagbark which I am not familiar with. The other is the tree named by Dr. Dennis of Cedar Rapids, which is a sweet bitternut. I have never seen the nuts of this tree. But you notice the fine branches characteristic of the bitternut.

Now we come to the chestnut. The last word has not been said about the chestnut in the East. We feel that the chestnut will some day come back. That slide of course needs no explanation. It is typical of what we have seen through the chestnut range from the lower New England states down through Pennsylvania to North

Georgia. This picture was taken in the very heart of the chestnut region in southern Pennsylvania. Most of these trees are gone.

Our great hope, we believe, lies in the introduction and breeding of blight resistant and weevil resistant chestnuts. The species which is being relied upon at the present time more than any other is that of the Chinese chestnut, Castanea mollissima. This is an average tree such as we found in northern China several years ago. I think Dr. Smith will agree with us that that is about a typical tree.

Dr. Smith: I think so.

Mr. Reed: One thing about this chestnut is that most of the trees we have seen, all seedlings, are light bearers, not at all like the Japanese species which are heavy bearers.

This is a typical view in the Riehl planting that you have heard about. It is among those scattered trees on those hillsides that the parent trees of a number of varieties originated. The Riehl chestnuts are, we think, Europeans crossed with the American. They are much larger than the American, and like the Europeans they are difficult to be husked. They have to be husked by hand. The Japanese husk themselves readily. The result is that the Endicotts of Villa Ridge are able to harvest and market their crop during the month of September. Mr. Endicott stated one year ago that the Boone nuts usually began their crop about the 4th of September and by the 25th they were practically all on the market. Fortunately for the people of Illinois, there is no blight in the state, or if there is it is not known; neither is the weevil of the East. The weevil a little farther south than we are here, down about Washington, is scarcely less of a menace to the chestnut industry than is the blight. I think if I were given the choice, I would rather blight killed them than to have the crop gathered and find each nut infested with a dozen weevils. Mr. Brooks, of the Department of Agriculture, kept track of the mollissima one year and found an average of 12 weevils to each nut.

The Riehl chestnuts are usually harvested from the 15th of September to the 15th of October.

This is the parent tree of the Boone photographed one year ago. Its present condition is not due to blight or disease of any kind but

to an ice storm that broke out the tops of many of the trees.

This is one of three trees resulting from nuts grown from cross pollination by Mr. Endicott's father. That photograph was taken in 1927 and the nut was planted in 1896. This is the parent tree of the Champion variety. You notice that strong central leader characteristic of the American species which indicates quite definitely hybridization with the European. Many of the nuts drop out but the great majority of them are separated by hand. The nuts and the burrs are picked up and taken by the Riehls to a pile and then all sit down and with gloves on separate them by hand.

This is the nut of the Fuller variety which Miss Riehl stated in her paper they regarded as their best variety.

The McFarland is the Japanese variety that the Riehls are growing. It was not originated by them. You notice how differently it grows. This comes from near the home of Dr. Theiss.

This is one view of the 400 acre grove of wild chestnuts grafted by the late Col. C. K. Sober, Lewisburg, Penn. They are all destroyed by blight, I understand, nothing is left. Dr. Theiss tells me there were 800 acres of land in the property and 400 acres put into chestnuts.

This is, I believe, the one that Mr. Riehl called the Parry.

This is the parent tree of the Van Fleet, No. 60. You notice there again the strong central leader.

Now we come to the filbert. Although the filbert is but a hazel, in the Pacific Northwest the trees are planted the standard distance of 25 to 30 ft., the varieties thoroughly interplanted to insure cross pollenation, as it has been definitely established that the filbert is largely self-sterile. The trees are trained to standard form headed up like other trees.

This is in the planting of Mr. Conrad Vollertsen across the lake from us, near Rochester. Mr. Vollertsen was himself an intensive gardener. Notice his trees close together and in between the rows he is growing nursery stock. He interplanted his stock, on the right Italian Red and on the left Lambert.

This is a view of the hybrids and the planting of Mr. Jones' at

Lancaster. Mr. Bixby and others have told you about his having made a number of very remarkable crosses. He first tried to apply a native hazel pollen on the pistillate flowers of European filberts with negative results, the same as had been the experience on the Pacific coast. Then he reversed the order and put Barcelona pollen on the pistils of the Rush variety with success. Later he introduced many other varieties. Those trees are remarkably vigorous, remarkably prolific. In this cluster there were 47 nuts.

The Corylus colurna, Turkish hazel commonly called. This photograph was taken in Oregon. There are several trees, probably the oldest in the United States, in Highland Park, Rochester.

On request of the chair that he report his progress in immunizing chestnut trees against the chestnut blight, Dr. Zimmerman spoke as follows:

Dr. Zimmerman: I did not expect to make an address when I came here, but inasmuch as some of our friends have been enquiring about this matter I will make a brief statement and I want it understood that what I am going to tell about is of a strictly experimental nature.

In the first place, I am fully convinced that these trees can be immunized and will be immunized.

In the second place, I have found it necessary to change my plan. I believe that there is more or less incompatibility between the grafted top and the root system, sufficient in some cases to kill the tree. With that in mind I have determined to get my plants on their own roots. I foresee the time when horticulturists at large will be getting their plants and trees on their own roots, unless there is some specific reason for not doing so. Naturally when I tried to get these trees on their own roots I ran up against more obstacles. I have several plans in mind. I believe it is possible to grow chestnuts from cuttings, although I have never done it. I did go sufficiently far so that if I could have had proper conditions I think I could have rooted them very well. The thing that makes me believe that is that two years ago ground mice ate off the root system entirely under two trees. When these trees dropped over I noticed that callus was

very well formed. I planted both of them and last fall I took up one and I found that it had a root system about four inches long. The one this year I allowed to remain and it has grown branches about 1 ft. in length.

Another method I have tried, I don't know whether anybody else has tried it or not, is by layering the chestnut. I have used a number of different methods. One is to graft them quite low and bury the graft, in the hope that they will root on their own stock. Another method was to use a container can, or something of that sort, place it on a stake and allow the limb to pass through it, girdle, and allow roots to develop. Whether that is going to be successful I don't know. Time will tell.

I am telling you this in order to give you an idea of why I changed my plan and how I was expecting to carry it out.

Now with the actual work of immunizing, I have not done a great deal of it this summer. I have only injected half a dozen trees, only trees that I wanted to save. Heretofore I found I had on my hands a lot of trees that were not worth saving. Next to a tree that is blighted I think a loafer tree is about as bad, and I don't propose to fool around and try to immunize anything that is not going to bear the best quality of nut that can be gotten.

I have one, a Champion, which I had given a couple of injections last year, where I discovered that the blight had almost killed the tree. It had gone around the tree except for the distance of half an inch. I gave three injections immediately and today it has callus at least $2\frac{1}{2}$ inches wide. The tree is in very good shape. Of course it is not entirely healed. As an extra precaution, some of the sprouts that came up I inserted into the trunk above the injection in order to protect it further if necessary, thus bridge grafting it.

A few of the trees on which I was making experiments last year have died, largely because I paid no further attention to them. I discovered they were worthless for my future results.

As I said before, I don't expect to offer a great deal of proof. I am not trying to convince scientists just at this particular time, but

sooner or later I think I can give them plenty of data to convince any reasonable man. In fact, if we can raise a blight-proof chestnut near Piketown, Penn., it is sufficient proof.

Last year I got into a discussion about immunity. A gentleman told me a tree could not be artifically immunized. Also that the top of a tree may be vulnerable, but the root of a chestnut tree was immune. I told him I did not concur in his belief. He gave as his reason for believing that the chestnut root was immune that it did not become blighted or die. As a matter of fact some of the roots do live but the reason of that is that they are protected, not immune. They are protected very much as a man's hands would be if he should put on a pair of gloves and go out in poison ivy. He is not immune, he is protected. The chestnut below the ground is protected by bacteria in the ground which destroy the chestnut endothia.

Question: Can you graft a native chestnut, pile up dirt around it and escape the blight?

Dr. Zimmerman: The immune chestnut, as it is referred to in my work, is a chestnut in which an antigen has been injected into its system and whose cells have developed a definite specific ferment which will digest the endothia parisitica.

With reference to grafting native chestnut stock with an immune variety, that is one of the reasons why I have tried to get my trees on their own roots. It is almost impossible to go into a blight-ridden district and graft trees and not have them become infected, and a great many of them will die from the infections before they have time to develop a new top. It can be done and I have done it but it requires a great deal of work.

Mr. Bixby: Would you mind telling the audience how the antigen is made.

Dr. Zimmerman: Last year I went into that rather extensively. There are about nine different methods of making the material. The way I have been doing so far is to grow the germs in pure culture on some suitable culture media, sterlizing them and preserving them with trikresol or phenol. Then they are ready to inject.

Mr. Bixby: I had reference also to applying the antigen after it had been made.

Dr. Zimmerman: I have tried a number of methods. This year I went so far as to make a can and to put on it the valve stem of a bicycle tube, expecting to force some material right into the cells of the tree under air pressure. My experience has been that they immunize better if it is put on the cambium. My method is the same one I spoke of last year. I make an incision across the tree. It is best not to make it too far around the tree, because if it becomes infected the blight goes around the tree and it has not to go far. Then I make another incision at right angles about 6 in. long. Then I take the knife and just raise the edge of the bark from the cambium on either side. Then I fasten over it a piece of paper, with hot paraffine. That makes a little cavity on the inside. With a medicine dropper I fill that cavity with the antigen, then seal it with paper and paraffine. Now I want to mention something else I have found. It is practically necessary in treating a diseased tree to have an autogenous vaccine. I found that in animal and human experimentation, and it is also necessary in plant experimentation in order to get results, in lots of cases. If there is any life left in a tree worth considering, it is possible to control the blight with an autogenous vaccine made from the germs in that tree.

There are other things besides blight that kill trees. I dug down to the roots of a tree and I found a chain lying there. The tree had grown up through the chain and it restricted nutrition.

Mr. Reed mentioned the weevil. I have a great deal more confidence in my ability to immunize a tree against the blight than I have to take care of the weevil.

Mr. Bixby: Do I understand, Dr. Zimmerman, that by autogenous vaccine you mean for each tree you make up a specific vaccine from an infection on that tree itself?

Dr. Zimmerman: Yes, that is what I have planned to do. I have selected the very best chestnut varieties I can get. I consider the Fuller as first, then the Boone, the Dan Patch and the McFarland. I am very partial to the McFarland, not only on account of the quality

of the chestnut but on account of the heredity at the back of it. I understand it is one of Burbank's creations. He told me his chestnuts contained about 25% Chinese, about 50% American, and some European and Japanese, and with that in mind I expect to get some good chestnuts from the McFarland.

I have been able to form a little idea of the relative resistance of the different chestnuts. I have a Japanese chestnut which is the most resistant of anything I have. The next I should say—this is not definite, it is merely comparative—is some of the Chinese. The Chinese chestnut at my place has not been absolutely blight resistant. If I were to graft them on the native trees the same as my other chestnuts they would not stand up much better than some of the other chestnuts that I have been immunizing. I feel that after I get some of my other chestnuts on their own roots they will have a better chance. Next as to resistance comes the Drescher, one that I have immunized. Then the Dan Patch, the Boone, the Fuller, and last of all the native American and the Rochester. The Rochester is the most vulnerable chestnut that I have. It is rare that I can keep it growing for one year without having it infected. I could not get it far enough to inject one dose of antigen before having it die.

The Secretary: Your Committee on Resolutions would respectfully report as follows:

First: That the thanks of this association be extended to the King Edward Hotel for the very pleasant assembly hall provided for the use of its members and especially for the friendly service so pleasantly extended to them at all times.

Second: We would especially commend the display of nuts of various kinds brought to the convention by Mr. J. U. Gellatly of West Bank, B. C.

Third: We would also commend the collection of nuts arranged by Prof. James A. Neilson, Extension Horticulturist of the Department of Agriculture.

We feel sure that this collection, and the one by Mr. Gellatly, were each a revelation to all members and visitors of the possibilities

of nut culture in Canada. Each of the displays is remarkable. The Dominion of Canada may well be proud of its success in nut culture as an added source of wealth in agriculture.

Fourth: We would extend our appreciation to Mr. Willard G. Bixby of Baldwin, N. Y., and to Mr. C. A. Reed, of the Department of Agriculture at Washington, D. C., for the displays of nuts presented by them. These demonstrated beyond question that many varieties of nut bearing plants may be successfully grown on American soil. They are an added beauty to the landscape and their fruits a vast increase to the value of the products of agriculture.

Fifth: We would return our sincere thanks to the following persons who kindly opened their home grounds for our inspection and made it possible for our members to see the various kind of nut trees growing in Canada:

G. H. Corsan, Carl James, Sir William Mullock, Howard Smith, Woolverton Brothers, Dr. John Smith, James Durham, E. F. Palmer, Director of Horticultural Experiment Station at Vineland, Sylvester Kratz, Ezra Hunsberger, and Peter McDermid.

WHEREAS, Mr. John F. Jones, of Lancaster, Pennsylvania, who was a leading member of this association, died at his home January 11, 1928;

AND WHEREAS, he was a leader in the United States in nut culture; he originated methods of cultivation; produced new varieties in his nursery, and stimulated an interest in all nut bearing plants by his uniform kindness and courtesy to all who called upon him for assistance or advice;

BE IT RESOLVED, that this association at its annual meeting, held in Toronto, Canada, September, 1928, does hereby extend to the widow and all members of his family, our sincere sympathy to them in their bereavement. We regret that "words are such weak things" and that we can do nothing more than to express our appreciation of a man who has done so much to make the world better and more beautiful because he lived.

BE IT FURTHER RESOLVED, that a copy of this resolution

be forwarded by the secretary to his family, and that it be entered upon the minutes of this convention.

James A. Neilson, Frank L. Baum, Henry D. Spencer,
Committee on Resolutions.

RESOLUTION OF THANKS ADOPTED BY THE BOARD OF DIRECTORS OF THE NORTHERN NUT GROWERS ASSOCIATION, INC., EXTENDED TO H. J. HILLIARD OF SOUND VIEW, CONN.

WHEREAS, Mr. H. J. Hilliard, of Sound View, Connecticut, was elected Treasurer of this incorporation at its first meeting held in Washington, D. C., September 28, 1923.

AND, WHEREAS, he has served this organization with great efficiency from that date to the termination of his term of office in 1928, without compensation, and has faithfully accounted for all of the funds entrusted to him.

BE IT RESOLVED by the Board of Directors of the Northern Nut Growers' Association, Inc., that the thanks of this organization be extended to the said H. J. Hilliard for the valuable services he has rendered, and conscientious manner in which he has cared for the funds which came to him as Treasurer during the many years he has occupied that office.

BE IT FURTHER RESOLVED, That a copy of this Resolution be spread upon the Minutes of the Association and another copy be sent by the President to Mr. Hilliard.

WILLARD G. BIXBY,
President.

HENRY D. SPENCER,
Secretary.

S. W. SNYDER,
W. C. DEMING,
JAS. A. NEILSON,
KARL W. GREENE,
Directors.

Upon motion the convention adjourned at 1 o'clock, the rest of the time on the 11th and 12th to be spent in visiting interesting points in and about Toronto.

FIELD EXCURSIONS

The field excursions to places where interesting or rare nut trees may be seen are perhaps the most valuable features of the meetings of the Northern Nut Growers Association. The Toronto meeting of this Association was up to the usual standard of excellence in this interesting part of the programme. The committee in charge of the programme arranged two excursions of more than ordinary length for the benefit of those who attended the convention. The first trip was taken on Tuesday afternoon, Sept. 11th, and consisted of visits to three places of interest. The party proceeded by motor coach and auto to Mr. George Corsan's place near Islington, where the first stop was made. Mr. Corsan, who is a well-known member of the association, has an interesting collection of many kinds of grafted and seedling trees. Amongst those of interest the following kinds were noted as doing well: Thomas and Ohio black walnut, Siers, Fairbanks and Laney hickories, pecans, Chinese walnuts, hybrid chestnuts, seedling heartnuts from Virginia sources, filberts and the Turkish tree hazel. Some of the black walnut, chestnut and heartnut trees were heavily loaded with promising nuts. The Turkish tree hazel and the Chinese walnuts are making very good growth and are interesting because of their rarity. After a hurried inspection of this place the party journeyed on to Thornhill where a stop was made at Mr. Carl James' place to inspect a small grove of pecan trees. There are five trees at this place which were grown from nuts obtained in southern Illinois more than fifty years ago. The trees have grown very well, considering their northern latitude (43.45 degrees) and the altitude (700 feet above sea level). The largest tree is approximately 45 feet tall, with a spread of branches equal to its height and a trunk diameter of nearly 16 inches. These trees have borne nuts quite frequently, but in only one year have the nuts matured. Inasmuch as the pecan is a native of regions several hundred miles south of the location of these trees, they afford an interesting example of the adaptation of trees to northern latitudes.

From Mr. James' place the group motored to the magnificent estate of Sir Wm. Mulloek, Chief Justice of Ontario and former Postmaster General of Canada. On this estate there is found the largest grove of black walnut trees in Canada. This plantation consists of 20,000 small trees and about 10,000 older trees, some of which have attained merchantable size. The large plantation of young trees was established in 1924-25 as a reforestration project. Before planting these trees Sir William Mulloek conferred with the writer of this article regarding the possibility of growing walnut trees. At this conference Sir William, who was then over 60 years of age, made a most significant and worthy statement which should prove an inspiration to men much younger than he. In effect the statement was this: "You know at my age I will not get any material benefit from planting these trees, but I will have a lot of fun watching them grow." In this day when materialism seems to be uppermost in the minds of so many people it is inspiring to find one of advanced years with such an altruistic outlook on life. After looking over this fine estate the delegates returned to the King Edward Hotel, to convention headquarters.

On Wednesday morning the party was considerably reduced by several members leaving for home and consequently the bus trip had to be abandoned. For those who did not have their motor cars, arrangements were made which enabled them to take in the trip through the famous Niagara district. The first stop on this trip was at Hamilton where the group assembled for guidance through the fruit belt. The party then motored to Winona to the fruit farm of Mr. Howard Smith, where a number of black walnut trees had been topworked about three years ago by the writer. These trees were making a good growth and in one case had nuts on, thus showing the possibilities in topworking the black walnut in the Niagara district. It may not be out of place to mention that a considerable number of other black walnuts have been topworked to English and Japs in this section by the party who pens these lines.

The next place of call was at Mr. Theron Wolverton's where a fine, thrifty, 16-year-old grafted pecan tree was seen. This tree has grown very well, but like the trees at Thornhill, has not borne ripened

nuts. Mr. Wolverton, who is an extensive peach and sweet cherry grower, kindly treated the nut growers to a delicious lot of peaches. From this point the party called on Dr. John Smith, of Grimsby, and there saw a fine seedling English walnut, the product of another large tree nearby. Luncheon was then enjoyed at the Grimsby Inn, after which the party drove over to see a plantation on Jas. Durham's place near Grimsby East. At this place there are two large old bearing English walnuts which have borne good crops for many years. In the season of 1925, Mr. Durham sold $76.00 worth from these two trees besides keeping a quantity for family use. There is also a young seedling grove of English walnut trees growing near these large trees. Some of these young trees bear very good crops of fine nuts. Close to the young trees a huge black walnut with a great spread of branches was noticed. There are also some interesting nut tree hybrids on this farm. One of these is supposed to be a cross between a Japanese walnut-butternut hybrid and the English walnut. This tree has grown very rapidly but has not borne good nuts and hence is only valuable as a study in genetics and as an ornamental. The Japanese butternut hybrids referred to above are large, thrifty, handsome trees and bear heavy crops of nuts somewhat like the butternut. These trees have very luxuriant foliage and are valuable as ornamentals as well as for the nuts.

From Mr. Durham's place the journey was continued to the experimental station at Vineland where the party were welcomed by Director E. F. Palmer. Mr. Palmer also gave an interesting outline of the more important features of the work being done at this station. On the grounds of the experiment station there is a small grove of grafted varieties of English walnuts, Japanese walnuts, black walnuts and several walnut hybrids. The black walnuts have done particularly well in growth and production of nuts. The best tree in this group bore 197 nuts four years after planting, a yield that is considered very good indeed. There is also a goodly number of filberts, a few Chinese chestnuts and walnuts and several hundred seedling walnut trees which were planted for stock purposes. After leaving the experimental station the party drove to Jordan Station to inspect some heartnut trees on the property of Sylvester Kratz. One of these trees is very large for its kind, being about 35 feet tall and

spreading more than 63 feet. This tree was said to be the largest seen by anyone present, and this probably means that it is the largest in eastern North America. Seedlings of this tree were planted on Mr. Housberger's farm nearby and these trees have made a wonderful growth. At 16 years of age the trees were over 45 feet tall and had a trunk diameter of 15 inches. The nuts of some of these trees seem to be a combination of the heartnut and the butternut, thus indicating hybrid origin. The wonderful growth of these trees indicates the great possibilities of plant breeding with tree crops.

From this point the journey was continued to Point Weller, the mouth of the Welland Ship Canal. Time did not permit of an inspection of the tree planting work being done by the W. S. C. and hence it may not be out of place to state that there are more than 5500 acres of land along the right of way to be planted to trees. This will involve the planting of several million trees, some of which will be nut trees. As a matter of fact, a movement is under way to establish a nut arboretum in this area and a good start has been made in this direction. More than 29,000 seedling nut trees are now growing in the nursery blocks and some grafted trees have been promised by interested parties.

From Point Weller the party went to Mr. Peter McDermid's farm about half way between Point Weller and St. Catharines. At this farm there is a fine thrifty English walnut which is a third generation tree, i. e., it is a seedling of a seedling which in turn grew from nuts borne on a tree brought out from Germany more than 100 years ago. The tree on Mr. McDermid's place bears good crops of very large nuts of fine quality and is rated as one of the best found in Ontario so far. Scions of this fine seedling have given better results in grafting than scions of other seedlings or varieties used in Ontario by the writer.

From Mr. McDermid's place the party went to St. Catharines where this pleasant tour ended after travelling more than 160 miles by coach and car during the two days on which field trips were held.

NORTHERN NUT GROWERS ASSOCIATION

ACCREDITED LIST OF NUT NURSERYMEN

January 1, 1929

	Black Walnuts	Chestnuts	Hazels*	Hickories	Heartnut**	Pecans***	Persian Walnuts****	Persimmons
Arrowfield Nurseries, Petersburg, Va.	S							
Willard G. Bixby, Baldwin, Nassau Co., N. Y.	S			S	S	S	S	S
John W. Hershey, Downingtown, Pa.	S		S	S	S	S	S	
Indiana Nut Nursery, Rockport, Ind.	S					S		
J. F. Jones, Est., Lancaster, Pa.	S		S	S	S	S	S	S
Rocky Ridge Nurseries, Round Hill, Va.	S					S		
E. A. Riehl Farm, Godfrey, Ill.	S	S						
Snyder Bros., Inc., Center Point, Iowa	S	S		S		S		
Conrad Vollertsen, 375 Gregory St., Rochester, N. Y.			S					
Whitford Nursery, Farina, Ill.		S						

The letter S in a given column opposite the name of a nurseryman indicates that that nurseryman is prepared to furnish grafted or budded fine varieties of these trees for delivery in the spring of 1929, but in some instances stocks are small. The persimmon is a fruit and not a nut but as it shares with nut trees difficulties of transplanting, and is propagated to a certain extent by nut nurserymen, it is therefore shown on this list.

To the prospective planter who may have the idea that every nurseryman on the list always has a full stock of each species and may be disappointed to learn otherwise, we would explain that from three to eight years must elapse from the time a nurseryman plants nuts before he can ship out grafted or budded trees and it is only in especially favored instances that the time is as short as three years. Furthermore the demand for nut trees has been steadily growing and every season for the last year or two nearly every nurseryman on the list has been sold out on some lines, frequently on nearly all.

*The European hazel is called the filbert.
**The heartnut is one of the Japan walnuts.
***Under pecans are included pecan x hickory hybrids.
****The Persian walnut is also called the English walnut.

The widespread interest in the roadside planting of nut trees has created a demand for seedling trees, which, for some reasons, are preferable to grafted trees for this purpose. One of these is the slowness of seedling trees in coming into bearing for which reason they usually get so large and strong and the bark gets so tough before they bear that, if boys do climb them to get the nuts, the trees are not injured. Grafted trees on the other hand usually bear much younger. Seedling trees also can be furnished at considerably lower prices than grafted trees but it should not be forgotten that nuts borne by seedling trees will almost certainly be greatly inferior to those borne by grafted trees. A number of the nurserymen on the above list will furnish seedling trees of some species for roadside planting. Prices and particulars can be obtained by correspondence.

The Association receives inquiries from correspondents on the Pacific Coast and from those who wish to plant some trees that are propagated by nurserymen on the Pacific Coast or in the southern United States. While there are a number of reliable nurserymen in each of these locations their names are not shown here for the reason that while some of the trees they propagate will do well in the northeastern United States, many will not. The Secretary will be glad to suggest sources of supply to those interested.

THE POSSIBILITIES OF A NUT ARBORETUM

Willard G. Bixby, Baldwin, N. Y.

In talking about a nut arboretum I wish at the start to dispel the impression that nut growing is something for the dim distant future. I wish also emphatically to state that we must not think that we cannot plant nut trees with the expectation of success till we develop new and improved varieties. We have at the present time fine varieties of nuts which, if wisely planted and properly cared for, will yield rich returns, and are doing so today.

It may be asked, if the varieties of nut trees that we have now can be planted with confidence, and we may expect profitable returns from them, why should we put any thought on something that will give us better varieties ten or twenty years hence, and why should we not concentrate our energies on planting commercial orchards now? This we should do by all means and those who do so wisely will get rich returns from their nut trees. Indeed this is the case today, and I hear every once in a while of annual returns per acre from land planted to nut trees greater than the entire cost of the land.

Every industry gets, at one time or another, into a condition where it produces as much as, or more than, the public will take, and then it becomes unprofitable until readjustments take place. These readjustments are aided by various things, and indeed the necessity for them may almost be eliminated by wise foresight. The development of improved product has its place in this wise foresight, as well as improved marketing, development of new uses for products, and many others, and it really is a fact that, just as the successful large manufacturing corporation of today needs to maintain a laboratory, experimental department or its equivalent, for developing new products, utilizing new materials, developing new outlets for its products, etc., so that its output may improve, be produced at lower costs, that new uses for its product may be found, etc., in order that the corporation may keep to the forefront, so the nut industry needs to look ahead and take means to keep pace with the times. A nut

arboretum is really the experimental department of the nut industry, or at least a portion of it.

A nut arboretum may be defined as a collection of the best varieties of each kind of nut bearing trees and shrubs, including not only those which rank high and are considered worthy of propagation because of a combination of good qualities, and which would be considered as probably fit for commercial planting, but also those with one quality outstanding even though other qualities are decidedly inferior.

A few years ago a nut arboretum with two specimens of each variety, and a larger number of the more promising ones, would have contained a modest number of trees and not have taken over about five acres, allowing a considerable amount of space for each tree. But now the search for fine varieties has developed nearly 100 varieties each of black walnuts, hickories and hazels, about 10 of butternuts and an equal number of Japan walnuts, and about 25 each of Persian walnuts, northern pecans and miscellaneous walnuts. There are a goodly number of chestnuts available for planting outside the blight area, and some 8 or 9 species of beech of which no variety of sufficient size to make it commercially valuable has yet been discovered, so, probably, room should be provided for 500 varieties to be set at once. It would be safe to say that about 30 to 40 acres should be set aside to properly house a nut arboretum, allowing space for additional meritorious varieties which probably will be discovered or produced in due course.

Assuming that the land has been provided and the young trees set out, they would have to be fertilized and cultivated in order to have them develop and get into bearing in reasonable time. The length of time taken to get the various trees into bearing will vary with the individual variety, some bearing very early and others tardier, but while I have known young trees of the earlier bearing varieties of nearly every species to bear a nut or two within two or three years after setting out, and while some will bear quite a number of nuts in the course of 5 or 6 years, it will probably be about 10 or 12 years before enough of the trees, between which hybrids are desired, will bear sufficiently so it is possible to do much work.

INDIANA
M. CALLISTER
SHELLBARK
COMMON

SHAGBARK
BEAVER
BITTERNUT

RUSH
JONES
269
DAVIANA

While growing trees of the various varieties of nuts tell us something before they come into bearing, and as they begin to bear, it is only after they have begun to bear fair crops, and to bear them with reasonable regularity, that they really begin to be very useful, and

The fine varieties that we have, so far, have all been discovered, that is some one found a tree bearing fine nuts and brought it to the attention of the Association or the Department of Agriculture, or to some nut nurserymen, and they have been multiplied by grafting, budding or some other means of vegetative propagation. The study that has been put on the fine varieties of nuts that we have has shown an increasing number to be hybrids between species. In some instances the parents are known and they are notably inferior to their offspring. While this does not mean that it is not important still to keep up the hunt for the best nuts of each species now growing, for it is not yet believed that all meritorious nuts have been found, it does point out a method of getting improved nuts, which probably eventually will be the means of getting greatly improved ones. This is by the systematic production of hybrids between selected parents. It is the method by which the wonderful modern advances in flowers and other plants has been obtained. When we know that some of the best nuts we have are hybrids between parents that ordinarily would be considered of little value, it indeed seems most likely that greatly improved forms would result from carefully conducted hybridization between selected parents.

After hybrid nuts are produced they should then be carefully preserved until time to plant them. The young trees that grow from these hybrid nuts should then be planted out, allowing each space enough to fruit. Probably it will be advisable to transplant once before setting in permanent places. After they fruit the best will be preserved and the others destroyed or top-worked to other varieties.

For best results a large number of hybrids should be made, for, within certain limits, the larger the number made the greater the probability of getting worthwhile new varieties. Some hundreds of acres of land should be available that these new varieties may grow to bearing. It will thus be seen that the testing of new varieties of nut trees is going to take considerable money to purchase the necessary land, and more to keep up the work after the land is secured. If 500

to 1000 acres are procured its cost may be around $100,000.00, or more, according to location. The cost might run $25,000.00 a year, or more, and the work would have to be kept up for a number of years.

From the above it will be seen that it is going to take land, money and time, ten to twelve years, to get the trees into condition before much of any work can be done, and ten more or so before one can know with certainty as to the result. With certain species, hazels and chestnuts for example, quicker results can be expected, for these have been known to bear within two or three years from planting the seed. Japan walnuts are also precocious, frequently bearing within 3 or 4 years from seed. Black walnuts have been known to bear within 6 years from seed, so that something will be learned as we go along, but nevertheless one must figure on about 10 years before the trees will be in condition to make hybrids and 10 more before we know what we have really done. This, from one standpoint, is not an inviting proposition, but that depends wholly on what we may expect to accomplish, and that we will consider now.

Figure 1, opposite page 96 shows four nuts, one the McCallister hybrid, to the left of it a northern pecan, the Indiana, one of the best of our northern pecans, to the right a shellbark hickory from a well known grove in Sigurney, Iowa, which the owner considers one of his best trees, and a common sized northern pecan. The McCallister is a hybrid between the pecan and the shellbark. While the particular pecan and the particular shellbark which are its parents are not known, there is no reason to believe they bore any better nuts than the average nuts borne by these species in the vicinity of Mount Vernon, Indiana, where the McCallister originated, and there is every reason to believe they were much inferior to the Indiana pecan and the shellbark shown. A tree is known which grew from planting a McCallister nut, and it bears a small round pecan. I have never seen it, but from the description of it would not think it to be much larger than the fourth nut shown. As noted above there is no reason to expect the parents of the McCallister to have been better than the ordinary pecans or shellbarks of southern Indiana, and yet in size at least we have something remarkable in the McCallister. Size is the only quality we can visualize, but as we can in hybrids combine any

good quality of one parent tree with a good quality of another, we can almost make what we want, provided we have the proper material to start with. We sometimes also will get a quality greatly superior to those found in either parent.

Figure 2, opposite page 97 shows the Beaver hickory and a common shagbark and bitternut of that part of Pennsylvania where it originated. The Beaver hickory evidently grew from a shagbark hickory flower pollinated with bitternut pollen about 1878. The tree which bore the shagbark nut which was planted is still standing, and it bears quite ordinary looking nuts, very much like the nut to the left, marked shagbark. Unfortunately a nut borne by this particular tree could not be located when wanted for this cut, but, as I remember, it is not very different from the nut shown. The bitternut shown in figure 2 is even larger than most bitternut hickories that I have seen from that section of Pennsylvania. Bitternuts are generally of small size and, while of thin shell, the kernel is so bitter as to be useless. Here in the Beaver hybrid we have ordinary plus worthless equals extraordinary. The thick hard shell of the shagbark has been replaced by one very much thinner and softer, and the bitter flavor of the bitternut by the fine flavor of the shagbark, and a nut produced larger than either parent.

Figure 3, opposite page 97 shows one of the results of the plant breeding work of the late J. F. Jones of Lancaster, Penn. The European filbert bears large nuts of fine flavor, but in the east generally bears sparingly and irregularly, often scarcely bearing at all. The American hazel bears large crops annually, but the nuts are much smaller and poorer than the European filberts. Mr. Jones attempted to combine in one nut the good qualities of both and succeeded in getting a number that promise well. He made hybrids between the Rush hazel, the best American hazel that we have, and several filberts. Mr. Jones did not leave notations telling the parentage of his hybrid hazels. He did, however, tell the writer of the Cosford variety being notable because its hybrids were much larger than either parent. It is probable that Jones hazel 269 is a Rush x Cosford hybrid, because, in addition to the large size, it shows the distinctive markings of the Cosford filbert. I had no Cosford nut to use in

making the cut shown and so used a Daviana nut which is similar to a Cosford. The weight of Jones hazel 269 is double that of an average Rush and Daviana nut together. While the testing of the Jones hybrid hazels is not complete, it seems likely that we have some that will prove commercially valuable. In this connection it should be mentioned that in the work of Mr. Jones, only about 1000 hybrid seedlings were set out, about 1/10 the number usually thought necessary to get worthwhile results.

If, as in the case of the McCallister hickory and Beaver hickory, we have very ordinary parents and an extraordinary offspring, what can we expect from carefully selected parents? If, in the case of Mr. Jones' hazel hybrids, we have selected parents but have made only about 1/10 the number usually thought advisable in such work, and yet a remarkable result is shown, what may we expect with the probability for excellence multiplied ten times?

In the matter of improving the beechnut we apparently must resort to plant breeding. The beech is a nut excellent in every respect except one. The shell is thin, a pocket knife is all that is needed to get the kernel out; the flavor is fine, second in my judgment to none, not excepting the pecan or hickory; it does its best in the north in sections where we now have almost no nuts that we can recommend. Its small size, however, is such as to make the nuts scarcely worth gathering. If we had a beech as large as a chestnut it would be worth millions to the country.

It is likely that work done for the purpose of breeding new varieties of trees, valuable for the nuts they bear, is likely at the same time to produce trees valuable for timber, for the nut trees are among our most valuable timber trees. A study made not so long ago by one of our forest experiment stations, to ascertain the reason for the wood of some trees of a given species being better than the wood of other trees of the same species, and to ascertain the conditions under which the development of timber was at its best, came to the conclusion that a tree that grew rapidly produced the best timber. It would seem that the rings formed at the close of each annual growth are a source of weakness, and the fewer of these the better the timber. This would suggest that, for the production of best timber, the faster the tree

grew the better. From the standpoint of saving time and expense in growing timber the same will hold, and so the selection of individuals that are of the most rapid growth is likely at the time to select the trees that will produce the best timber.

I have visited many of the parent nut trees which are being propagated and, as a class, they are rapid growing trees. Why this is so I do not know. It may be simply the result of the survival of the fittest in the struggle for existence in their early days. Furthermore, were they not rapid growers they would not be likely to have the vigor to produce large crops of nuts, and this is one quality which makes a tree deemed worthy of propagation. Be that as it may, however, it is not the less a fact that our propagated nut trees and shrubs, as a class, are remarkable not only for their fruit but for the rapidity of their growth. I will give an example recently seen. Not so far from Toronto there is a heartnut tree notable because of the excellent nuts it bears; it is the largest and seemingly the most rapid growing heartnut tree I have ever seen. The tree is apparently not much over 30 years or so of age, and yet it is about two feet in diameter and over 60 feet spread. Seedlings from this tree, which evidently had accidentally been pollinated with butternut pollen, and produced Japan walnut x butternut hybrids, are about 40 ft. high and nearly 12 in. in diameter, and seemingly only about 15 years old.

Other instances of the remarkable growth of hybrid trees are well known. I will relate some. The parent "Carolina poplar" tree at Metz, France, in 1914 was described by Augustine Henry as 81 years old, no less than 150 ft. tall and 25 ft. in girth (about 8 feet in diameter) five feet above the ground and still growing rapidly. The James River walnut in Virginia was described in 1905 by Col. W. A. Jones, U. S. A., as 10 ft. in diameter at the height of a man's head and so lofty that even though surrounded by large trees it seemed from a distance to be standing alone. The Greenbay hybrid pecan near Burlington, Ia., stands on land owned by the Mississippi River Power Co., which they were obliged to purchase when the Keokuk dam was built because it was subject to overflow. In order to get something from their enforced purchase, they sent men through and cut the timber. The Greenbay hybrid pecan was so large, however, that they did not have tools big enough to cut it and so the tree escaped.

The work of breeding new and better varieties of nut bearing trees for their nuts and for their timber will take land, money and time, but are not really worthwhile results promised? What better work can be found for say $1,000,000.00 than the establishment and endowment of a nut arboretum, or the taking up of such breeding work in earnest by an existing arboretum. We import about $35,000,000.00 worth of nuts annually. The year book of the U. S. Dept. of Agriculture for 1927 shows about $25,000,000.00 worth of nuts raised in the United States. It also shows the production of over 18,000,000,000 pounds of meats raised, the value of which is probably over $2,000,000,000. If, as we firmly believe, nut kernels will to a considerable extent take the place of meat, it means that we shall have to raise many times the nuts we are raising now, and that we shall have to grow nuts not simply in a few small sections, as in the case now, but that we must have varieties that can be commercially grown almost anywhere in the United States and Canada. This will add many millions of dollars, if not hundreds of millions, annually to the value of our farm products, a rich return for an investment now of say $1,000.000.

Systematic work on nut trees may also solve the problem of growing timber, which is absolutely impracticable in many locations on account of the length of time needed to mature the crop. Producing trees that will grow to marketable size in a relatively few years will go a long way toward solving the problem of timber growing.

I might say, furthermore, that the work of the past few years has shown how short cuts may be taken. While it would take ten years to get a brand new nut arboretum established and ready for hybridization work, yet by taking proper means it is not necessary to wait that length of time before anything other than preliminary work can be done. Ten years ago this was not possible, but now a good deal can be done even the first year, and the results would increase each year.

Taking everything into consideration, is not the promise of results from systematic work on the nut trees most alluring? To be instrumental in developing and perfecting a new agriculture and a new forestry is indeed worth while, and an opportunity that comes only occasionally.

NUTS EXHIBITED BY U. S. DEPT. OF AGRICULTURE

Pecans—Northern

Busseron, Butterick, Greenriver, Indiana, Major, Niblack, Norton, Posey, Warrick.

Pecans—Southern

Schley, Stuart.

Shagbark Hickory

Dennis, Drew, Hales, Kentucky, Kirtland, Lingenfelter, Manahan, Swaim, Taylor, Vest, Weiker, Shagbark Seedling.

Hybrid Hickory

Fairbanks.

Miscellaneous Hickory

Hicoria Aquatica (Water hickory), Hicora Alba (Mocker nut), Hicoria Glabra (Pig nut).

Chestnuts—Riehl Group

Champion, Fuller, "Parry", Progress, Van Fleet.

Japanese Chestnuts

Parry—Parry Bros., Parry, N. J.; Boone—Jap. X Am. Hybrid, by G. W. Endicott; Seedling from Alabama.

Chinese Chestnuts

Paragon, Hybrid—European x American, Seedlings.

Chinquapin

Rush.

Filberts

Althaldensiaben, Aveline—White, Barcelona (Vollertsen), Barcelona (Quarnberg), Bony Bush, Büttner, Bolwyller, Brixnut, Bürkhardt, Clackmas, Daviana (Dorris), Daviana (Vollertsen), Du Chilly, Early Globe, Gunzelbener, Hallischeriesen, Italian Red, Kentish Cob, Kruse, Large Cob, Lambert—Red, Lambert—White, "Medium Long", Minna, Montebello, Nocelunghe, Nottingham, Trebizonde.

Filbert Hybrid

Rush X White Avelene (Jones)

Native Hazels

Merribrooke, Rush of Jones, Rush of Rush.

Miscellaneous Hazels

Corylus Avelena, Corylus Colurna, Corylus Rostrata.

Black Walnuts

Ohio, Stabler, Ten Eyck, Thomas.

Japanese Walnuts

Faust, Lancaster, Sieboldiana Seedling, Sieboldiana Seedling.

Manchurian Walnuts

Juglans Mandschurica.

Butternuts

Seedling.

Pine Nuts

Pinus Banksiana, Pinus Edulis, Pinus Excelsa, Pinus Koraiensis, Pinus Jeffreyi, Pinus Lambertiana, Pinus Mugho, Pinus Parryana, Pinus Torreyana.

NUTS GROWN AND EXHIBITED BY WILLARD G. BIXBY, BALDWIN, N. Y.

Faust Heartnut, Lancaster Heartnut, Ritchie Heartnut, Stranger Heartnut, Kentucky Hickory, Cedar Rapids Hickory, Rush Hazel, Champion Chestnut, Miracle Chestnut, Chinquapin.

NUTS EXHIBITED BY J. U. GELLATLY

Chestnuts

American, Japanese.

Filberts (in husks)

A Feuille Pourpre, Cosford, Craig, English Cob, Fertile de Coutard, Kentish Cob, Nottingham, Pearson's Early Red, Pellicule Rouge, Red Hazel.

Black Walnuts

Atkin, Barley, Impet.

Japanese Walnuts

Sharp's Sieboldiana, Seedling Sieboldiana, Seedling Sieboldiana in husk, Calendar Heartnut, Dark Heartnut, Gellatly Heartnut, No. 5 Gellatly Heartnut, No. 6 Gellatly Heartnut, No. 20 Gellatly Heartnut, No. 21 Gellatly Heartnut, Mackay Heartnut, O. K. Heartnut, Walter's No. 1, Walter's No. 2.

Persian Walnuts

Richie (in husk).

Chinese Walnut

Seedling.

Butternuts

Seedling.

Persian Walnut

Franquette.

Miscellaneous

Ginkgo Nuts, Jars of Pickled Jap. Walnuts, One Year's Growth of 7½ ft. of Japanese Walnut, One Year's Growth of 7 ft. of Filberts, One Year's Growth of 7 ft. of Almond, Japanese Catkins 18 inches long.

LIST OF NUT EXHIBITS SHOWN BY JAS. A. NEILSON, DEPARTMENT OF AGRICULTURE, PORT HOPE

English Walnuts

22 Plates

St. Catharines 3, Queenston 1, Pt. Dalhousie 1, Beamsville 1, Grimsby 1, Ruthven 1, Clarkson 1, Niagara 4, Vineland Sta. 4, Vineland 1.

Almonds

2 Plates

Ridenhower (St. Williams, Ont.); Ridenhower (Gellatly, B. C.).

Ginkgo

1 Plate with specimens from Hamilton and Montreal

Filberts

14 Plates

Whiteskin, Redskin, Kentish Cob, Cosford Cob, Bonybush, Barcelona, Daviana, Pearson's Seedling, Bullnose, Native Hazel, Furbish Hazel, Italian Red, Merveille de Bollweiler, Seedling.

Shagbark Hickories

Simcoe, Chatham, St. Annes, Grimsby, Waterford.

Hybrid Hickories

Laney, Beaver.

Japanese Walnuts

(A) Siebold type from Scotland, Ont.; Pt. Dalhousie, Ont.; Picton, Ont.; Kingston, Ont.; Aldershott, Ont.

(B) Heartnuts from Gellatly, B. C., 2 plates; Scotland, Ont., 1 plate; Dunnville, Ont., 1 plate; Columbus, Ont., 1 plate; Jordan Sta., Ont., 2 plates; Vineland Sta., 2 plates; Vineland, 1 plate; St. Thomas, 1 plate.

Hybrid Walnuts

Cinerea x Sieboldiana, Cinerea x Cordiformis, Sieboldiana x Regia.

Black Walnuts

Thomas, Ten Eyck, Ohio, McCoy, Seedling.

Chestnuts

Japanese Walnut, Queenston, Ont.; Hybrid Chestnuts, Fonthill, Ont.; Vineland, Ont.; Chinese Chestnut; Native Chestnut, Burlington, Ont.

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